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SOME CLINICAL ASPECTS OF SINUS THROMBOSIS WITH SPECIAL REFERENCE TO THE PATHOLOGY.*

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Sinus thrombosis presents a variable clinical picture. The occurrence of chilly sensations or a distinct chill, a temperature curve showing a rapid rise and fall, a blood stream containing living streptococci, these findings give a familiar symptom-complex. Deviation from the so-called classical clinical picture, and variations of it studied in regard to the existing pathologic lesions afford interesting data of which comprehension is not so common. With a view to accentuate and familiarize the varying types, the following twenty cases are presented:†

Analyzing the case histories presented above a few words are necessary on the pathologic conditions that were uncovered.

The mastoid lesions found were: (a) of the coalescent type; (b) of the hemorrhagic type; (c) of chronic mastoiditis; (d) entire absence of mastoid cells.

By the *coalescent type* of mastoid lesion is meant that form of mastoid involvement in which the inter-cellular walls become broken down and coalesce. The mastoid process becomes more or less filled up with detritus and the sinus is reached by the lesion through contact. Technically a perisinus abscess is very often present, and the sinus wall is either necrotic, or discolored, or covered with granulations. Of the group of cases here reported five presented this type of mastoid lesion, and four of these gave a diseased appearance of the sinus wall.

The thrombus is formed in this group of cases as a defence placed by nature to protect the blood stream against the invasion. The thrombus forms and is at first sterile, and only secondarily becomes infected.

Secondary lesions are uncommon in this group, and recovery of the patient is the usual outcome, when surgical interference is promptly instituted.

The thrombus was demonstrable in four cases, and not found in one of this group. Of this group four recovered, and one died. The fatal case presented in addition to the sinus involvement a general purulent meningitis.

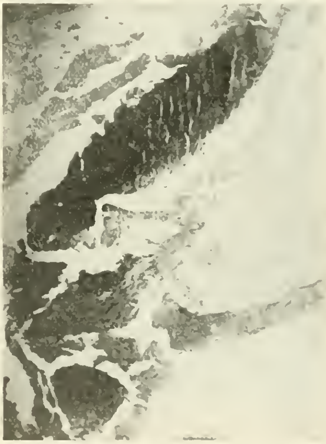

Plate I. Coalescent Mastoiditis
The loss of nuclei in the bone is seen. The general destruction of cell walls are noted. Detritus and pus fill the spaces taken up by the cells. (Author's specimen).

By the *hemorrhagic type* of mastoid lesion is meant a mastoid involvement whose most characteristic lesion is usually presented in true influenza infections of the mastoid process. In this type of lesion, the bony walls separating the mastoid cells from one another are not broken down. Their lining mucosa is thickened and infiltrated with hemorrhagic infections. One sees on microscopic sections taken from this type of lesion the intact bony walls, the very swollen appearance of the mucosa, and the great engorgement of the bloodvessels with their interior filled with blood cells. This bloodvessel engorgement gives the type its characteristic name, and is the distinguishing lesion. The infection is situated in the mucosa and in the bloodvessels. Clinically such cases are very septic, and the septic material reaches the larger vessels and eventually infects the sinus.

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* Presented at the Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Chicago, September, 1915.

† For the purposes of this paper, the detailed case histories are unnecessary. In the presentation before the Academy, a lantern slide demonstration of the pathologic lesions and temperature charts was given in more detail than is possible here.

The thrombus which forms in the lumen of the sinus grows *without* making any abnormalities apparent on the sinus wall. The thrombus is infected primarily. We must still look upon the formation of the thrombus as Nature's effort to stop the entrance into the circulation of septic material, but because the particles of infected matter are in the blood stream from the start, before the thrombus can form, therefore, secondary lesions are common with this type of case. In fact, they often develop simultaneously with the growth of the clot in the sinus. With the newer means of making early diagnosis—blood culture—it very often happens that no appreciable clot is demonstrable, yet the opening of the sinus, and the resection of the internal jugular stops the septic course of the disease and recovery ensues. Thrombi were found in two cases, and were not demonstrable in three.

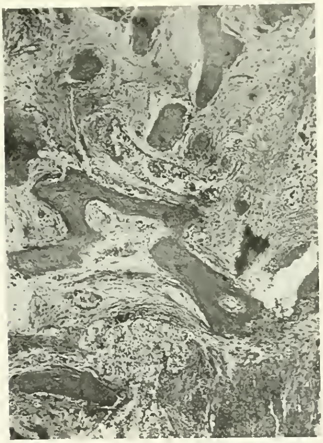
Plate II. Hemorrhagic Mastoiditis.
The bony cell walls are intact, and normal. The marked swelling of the mucosa, the large numbers of blood vessels, and the enlargement of these vessels are characteristic of this type of lesion. (Author's specimen.)

That the jugular vein may be the seat of inflammatory lesions in cases where no thrombus is demonstrable is shown by examination of the walls of such veins. Fig. 3 is from such a case. (Case 17 of the chart.)

The hemorrhagic type of mastoiditis was found five times among our cases. The appearance of the sinus wall was normal in all five of these. The blood culture was positive in two, was not taken in one, and negative in two.

Secondary lesions were found in four of them. In one the secondary lesion was a cavernous sinus thrombosis. The joints and muscles were the seat of abscess formations in two, and the endocardium was involved in one. Of this type of lesion there were four recoveries, and one death.

The sinus showed a thrombus in five cases whose mastoid process was the seat of a *chronic mastoiditis.* By chronic mastoiditis is meant cases which present a chronic otorrhea for a number of years, or whose mastoidal lesion demonstrates a lesion as the result of the presence of cholesteatomata; those due to caries and necrosis, or those in which a chronic suppuration of the tympanic mucosa presents an acute exacerbation.

In most of such cases the sinus is reached through contact, or through purulent tracts extending to the sinus through a more or less sclerosed bony mastoid process.

Very often the onset of the invasion of the blood-vessel marks the commencement of the acute illness. This type of mastoid lesion was found five times. The blood culture was positive four times, and in the other case was not taken. The sinus wall was normal in appearance in two cases; it was pathological in three. A thrombus was demonstrable in four of the cases, and no clot was found in one of them. This case, however, gave free pus from the bulb and no bleeding from the jugular dome. The thrombus seemed to have undergone degeneration.

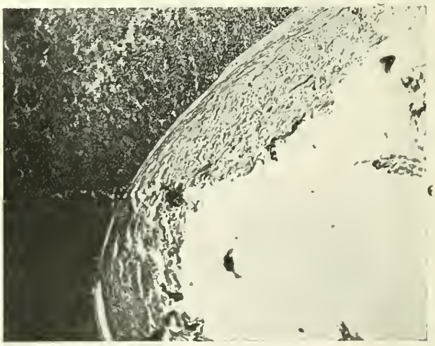
Plate III. Jugular Wall.
Very much thickened and indurated. From a case with no thrombus in the sinus. (Author's specimen.)

Secondary lesions among this group of cases were common. Pneumonia was presented three times, and one case presented a brain abscess. The absence of a secondary lesion was noted once.

Because of the frequency of the secondary lesions,

TWENTY CASES WITH CLINICAL AND BLOOD PICTURE OF SEPTIC INVASION OF THE BLOOD STREAM.

No.	Identification	Age.	Duration.	Type of Mastoid Disease	Anatomical Anomalies	Blood Report	Clinical Picture.	Appearance of Sinus Wall.	Intermediate or Secondary Lesions.	Thrombus	Result.
1.	Chas. Wil.	45 yrs.	5 mos.	Coalescent	Sinus far forward bisecting mastoid process	None taken	Not septic	Granulation on sinus.	None	Clot found	Recovery
2.	B. S.	6 yrs.	3 dys.	None present	Absence of all cells in mastoid process.	None taken	Not septic	Normal	None	Clot found at autopsy	Death
3.	D. D.	14 mos.	10 dys.	Coalescent	Nothing unusual.	Positive	Septic curve	Normal	None	Clot found	Recovery
4.	Sch.	25 yrs.	Unknown	Chron. Mastoiditis	Nothing unusual.	None taken	Septic curve	Normal	None	Clot found	Recovery
5.	McD.	32 yrs.	3 wks.	Coalescent	Nothing unusual.	Positive	Septic curve	Discolored and granulations.	None	Clot found	Recovery
6.	Mrs. Rap.	?	1 wk.	Hemorrhagic	Nothing unusual.	Negative	Septic curve	Normal	None	Clot found	Recovery
7.	M. C.	27 yrs.	2 wks.	Acute exacerbation of Chronic Mastoiditis	Nothing unusual.	Positive	Temperature high, but not typically septic	Sequestra involving sinus wall, granulations, discolorations.	Lobar pneumonia of upper lung (left)	Clot found	Recovery
8.	A. D.	6 yrs.	2 wks.	Hemorrhagic	Nothing unusual.	Not taken	Septic curve	Normal	Left knee joint inflamed, abscess between shoulder blades; endocarditis	Clot found	Recovery
9.	H. W.	24 yrs.	1 wk.	Not stated in record	Very narrow, deep mastoid; sinus very far forward.	Positive	Septic curve	Normal	Right knee joint diseased.	Not found	Recovery
10.	Mrs. R.	45 yrs.	3 wks.	Not stated in record	Nothing unusual.	First negative Later positive	Septic curve	Normal	Left lober pneumonia; abscess in right axilla; left knee joint abscess	Clot found	Death
11.	A. W.	27 yrs.	5 dys.	Chronic Mastoiditis	Entire mastoid sclerosed.	Positive	Septic curve	Perisinus abscess, pus in bulb.	Pneumonia; meningism from sepsis.	No clot found	Death
12.	Rose F.	12 yrs.	Unknown	None: Case operated upon for persistent post auricular fistula.		Negative	Septic curve	Normal	Septic meningitis.	Clot found	Death
13.	J. F.	46 yrs.	1 wk.	Chronic Mastoiditis, acute labyrinthitis	Sclerosed mastoid.	Positive	Septic curve	Normal	Septic meningitis; pneumonia.	Clot found	Death
14.	Baby C.	[illegible] yrs.	1 wk.	Hemorrhagic	Nothing unusual.	Not taken	Septic curve	Normal	Endocarditis.	Clot not found	Recovery
15.	Baby S.	2 yrs.	10 dys.	Coalescent	Very pneumatic mastoid.	Not taken	Septic curve	Normal	No lesion found, but daily convulsions and high fever until sinus was opened and ends plugged off	Clot not found	Recovery
16.	Sid M.	3 yrs.	4 wks.	Hemorrhagic	Abnormally thick cortex.	Early negative Late positive	Septic curve	Normal	Cavernous sinus thrombosis.	Clot not found	Death
17.	Mr. O'C.	[illegible] yrs.	1 wk.	Hemorrhagic	Nothing unusual.	Positive	Septic curve	Normal	Abscess left hand, inflamed right knee joint, abscess on back over crest of ilium	Clot not found	Recovery
18.	Louis Mich.	9 yrs.	3 wks.	Chronic Mastoiditis	Nothing unusual.	Positive	Septic curve	Perisinus abscess; granulations on wall.	Abscess, temporo-sphenoidal lobe	Clot found	Death
19.	Fern.	50 yrs.	Unknown	Coalescent	Nothing unusual.	Negative	Septic curve	Granulations; necrotic sinus wall.	Lepto meningitis.	Clot found	Death
20.	Morris Less.	47 yrs.	21 dys.	None present	Absence of all mastoid cells in process.	Positive	Septic curve	Normal	None.	Clot found	Recovery

the percentage of recoveries in this group is small. There were three deaths and two recoveries in this group.

Among the cases whose histories constitute the basis of this report are two of a type which the writer first described in a preliminary report published in *The Laryngoscope*, March, 1915. These cases are characterized by an anatomical anomaly. The mastoid process presents externally a normal topography as to its cortex. There is, however, an *entire absence of mastoid cells* in its interior. I presented the first case of this type before the Otological Section of the N. Y. Academy of Medicine on October 9, 1908. Since then I have collected six specimens of temporal bones of this type and one other case reported in *The Laryngoscope*, March, 1915.

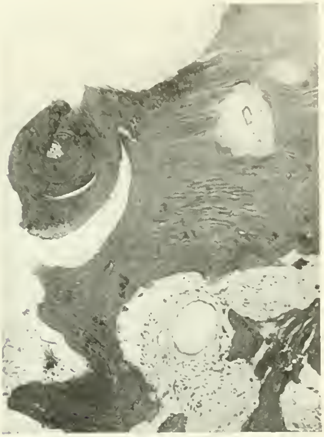

Plate IV. Chronic Mastoiditis.
The bony partitions are thickened and hardened. The mucosa is swollen. Detritus is found in the air cells. (Author's specimen.)

The middle ear in these cases is first involved, and from the mastoid antrum, which is the only cell present, the disease spreads either by contiguity or through the network of venous channels, directly to the sinus and infects it. Clinically, this group of cases is usually not placed under otological supervision. The absence of pain referable to the ear, the sudden onset of septic symptoms give rise to such errors of diagnosis that the cases remain under the supervision of medical men, and the fatal termination often precedes a recognition of the condition.

Of this group I present two cases in this study. In the first the autopsy revealed the condition. The other case was happily diagnosticated in time for surgical intervention to save life. In the latter case, the positive blood culture preceded the demonstration of the thrombus.*

The character of the mastoid lesion is not noted in the records of three of the cases. Of these one had a normally appearing sinus wall, but a positive blood culture, and the clot was demonstrable. The second gave a positive blood culture late, earlier cultures being negative. In this case a clot was found. In both these cases secondary lesions were present. In the first a lobar pneumonia, and abscesses of the knee joint and axilla, and in the second a knee-joint suppuration. The first case died, the second recovered.

The third case in this group was Case 12, Chart I. Here operation had been performed on the mastoid some months previously, and there resulted a persistent post-auricular fistula. A plastic operation was performed to close this fistula, and after a week's time, septic symptoms came on. The blood was negative, and the sinus wall normal in appearance, but a thrombus was found. The patient died of septic meningitis.

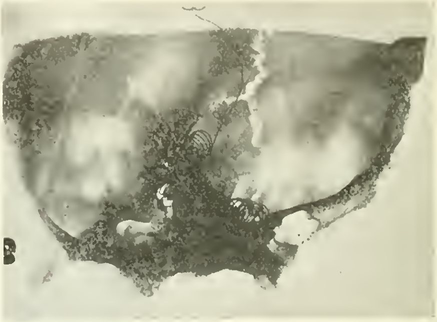

Plate V.
X-ray photograph of the temporal bone of adult male about 32 years of age. Absence of mastoid cells, close juxtaposition of venous channels to middle ear shown by wire placed in sigmoid sinus groove, in middle ear and antrum, and in dome of jugular bulb. Photographed from above.

Summarizing our observations, we have the following:

Number of cases studied	20	
Hemorrhagic type of mastoiditis in	5	cases
Coalescent type of mastoiditis in	5	"
Chronic mastoiditis in	5	"
Absence of mastoid cells in	2	"
Mastoid lesion not recorded in	3	"
Secondary lesions were present in	12	"
Sinus walls were normal in	14	"
Sinus wall was pathologic in	6	"
Thrombus demonstrable in	15	"
No clot in sinus in	3	"
Sinus not opened in	2	"
Blood culture positive in	11	"
Blood culture negative in	3	"
Blood culture not taken in	6	"
Death with thrombosis only in	1	"
Death with secondary lesions in	7	"
Total deaths	8	"
Recoveries with thrombosis in	7	"
Recoveries with secondary lesion in	5	"
Total recoveries	12	"

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* For details of this case see **The Laryngoscope**, March, 1915.

A brief note on the surgery instituted: Excepting Case 2, (Chart), where the condition was found only at autopsy, surgical procedures consisted in opening the sinus, removing the thrombus, and resecting the internal jugular vein.

In cases 14 and 15, surgical interference was limited to opening the sinus. No procedures were instituted upon the jugular. This often suffices in children.

In Case 9, surgery was limited to opening the sinus. The bulbar end was found free from clot, and a plug shut off the circulation from further invasion. All these cases recovered.

In one, Case 13, it was impossible to find the internal jugular vein.

From these observations we may draw the following conclusions:

1. The type of mastoid lesion is an important factor in determining the gravity of a given case of sinus thrombosis.
2. The hemorrhagic type of mastoiditis presents secondary complications more frequently than do the other types of mastoiditis.
3. The normal appearance of a sinus wall is no indication as to the presence or absence of a thrombosis of the sinus.
4. Since infection of the bloodvessel wall may proceed in either direction, i. e., either with or against the direction of the blood current, the resection of the internal jugular is recommended in spite of a normally appearing sinus wall, and the failure to demonstrate a clot within it, where septic temperature continues, and a positive blood culture is found.
5. In the absence of a positive blood culture, with pyemic symptoms, and conditions presented as in paragraph 3, with advent of abscess formations in muscles, or joints, or endocarditis, a resection of the internal jugular is recommended.
6. Secondary lesions, excluding meningitis, while aggravating the gravity of the prognosis, do not necessarily mean a fatal prognosis. Of my 12 recoveries, five had secondary lesions.

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Hyperthyroidism After Operation.

The following factors undoubtedly influence and materially aid in causing acute hyperthyroidism following operation, and from observation and deductive reasoning they are of greatest potency in the order named: (1) Trauma, (2) hemorrhage, (3) shock, (4) prolonged anesthesia, and (5) prolonged operation. No technic is adequate which does not minimize these five factors.—W. L. Crosthwait in *Texas Medical Journal Red Book.*

THE TREATMENT OF DEFLECTED NASAL SEPTA.*

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The etiology of septal deflection has provoked volumes of discussion. It is claimed by many observers that absolutely normal and straight nasal septa are rarely seen among the civilized people, whereas the converse is true in savage races. Thompson cites two reasons for the frequency of septal deviations in Caucasians: (a) increased cranial development with enlargement of the facial angle, and (b) admixture of the different races. Morgagni believes septal deviation is due to excessive upward growth of the vomer; Trendelenburg and Freeman emphasize the persistent high-arched palate as a cause; other authors consider faulty development of the facial bones as the essential etiologic factor; Talbot holds neuroses or the stigmata of degeneracy resulting in faulty development of the facial bones responsible for deflected septa. Certain authors state that the high arch is invariably due to rickets which in turn causes septal deflection the essential fact in the argument being that in almost 95 per cent. of such cases septal deviations are present. Other presumed predisposing causes are the various so-called diatheses, such as syphilis, tuberculosis, cretinism, etc. It is not difficult to understand that if development of excessive adenoid growth be permitted to progress undisturbed in an otherwise comparatively normal infant, there will subsequently be noted a high-arched palate, malocclusion of the teeth, and still later in life a deflection of the nasal septum. Excessive development of the middle or inferior turbinate may cause deviation by pushing the septum to the opposite side, and this will also apply to nasal tumors, polypi, and foreign bodies. Last, but not least, trauma is a prominent factor in the causation of deviation, especially in the cartilaginous septum, but it hardly seems possible that a blow upon the nose could fracture the perpendicular ethmoidal plate or vomer.

Septal deviations are frequently seen in children after the second dentition, and occur more often in males than in females, perhaps because of their greater exposure to injury. Obviously, when the septum is greatly deflected from its normal position, it becomes too long for the vertical nasal diameter. "The development of these structures is no doubt greatly influenced by the causes of nasal obstruction, with its associated mouth-breathing; as adenoids in early childhood produce a high, narrow-arched palate, and an undersized, receding upper jaw, consequently the floor of the nose is diminished, and the septum is crowded out of its proper abode: so if the septum continues to develop, it must be distorted."

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* Read before the Society of Physicians and Surgeons, of Louisville, Kentucky, October 21, 1915

Deflections of the septum are classified according to their location and extent. When of traumatic origin the deflection is usually confined to the cartilaginous portion of the septum, and three varieties have been noted; (a) if situated far forward, it is ordinarily a dislocation of the columnar cartilage and may be readily seen behind the vestibule; (b) angular deviation extending antero-posteriorly, its importance depending upon whether or not it impinges upon the middle or inferior turbinate; (c) perpendicular deviation, which usually occurs at about the middle of the cartilage. The deflections that occur during the process of development also present several varieties, ranging from a bony ridge along the vomer to a marked bulging of the perpendicular ethmoidal plate, or a combination of the two.

Ballenger divides septal deformities into: (1) cartilaginous deviation, comprising the anterior portion, which is turned outward into the vestibule of the nose and obstructs respiration; angular deviation, which obstructs both the middle and inferior meatuses; and vertical deviation, which interferes with proper ventilation; (2) osseous deviation, comprising a bony ridge along the upper border of the crista nasalis and the vomer, which encroaches upon the inferior turbinate, causing local irritation and interfering with posterior drainage; deflection of the vertical plate of the ethmoid bone, impinging upon the middle turbinate and interfering with drainage and ventilation of the accessory sinuses on the convex side. Kyle divides deviations into two classes, i. e., those with and those without external deformity; he also mentions the "S" and "C" types, and those with formation of redundant tissue.

According to Thompson the deviation may assume the form of a diffuse or cup-like bulge, a tray, the swelling of a sail, or the inside of a saddle. "It is obvious, therefore, that while classification into groups is perhaps helpful for the purpose of study, it is useless and deceptive in practice, for there are so many irregularities and anatomical peculiarities that it would be diffcult, even impossible, to form a classification which would embrace all of them."

Among the subjective symptoms of deflected nasal septa may be mentioned a sense of fulness in the lower portion of the nose, if the deviation impinge upon the body of the inferior turbinate; or in the "bridge" of the nose or between the eyes, if the deviation be high. If the deflected septum has caused irritation of the ethmoid cells, pain may be noted at the inner angle of the orbit and over the lachrymal bones with or without pressure. If the deviation be very high the patient often complains of frontal headache, which is worse in the morning and gradually improves during the day, in contradistinction to headache of ocular origin. Vertigo is oftentimes associated with septal deviation, and, unlike that due to ocular disease, is increased by leaning or jarring of the body.

The nasal secretion undergoes certain changes. The mucus becomes heavier and collects in the lower portion of the nasal passages, forming scabs of heavy mucoid material which can be expelled only by forcible blowing. "Post-nasal dropping" is an annoying symptom in most instances, and if the deflection is anterior there occurs an obstructing stenosis of the nares.

Objective symptoms range from (a) dislocation of the columnar cartilage which may be seen bulging into the vestibule, (b) a picture through the nasal speculum of a bony ridge along the floor of the nose, (c) an unequal distribution of the space caused by bulging of the septum with its accompanying concavity toward the corresponding side.

The treatment of deflected nasal septa is distinctly surgical, and relief is obtained by operation in the majority of cases, especially since the submucous route may be used which leaves no large areas of scar tissue with its dryness and scab, and since the removal of the wayward promontory of bone or cartilage leaves a functionating mucosa.

There are several indications for resection of the nasal septum in addition to correction of the deformity, *per se*, viz., in acute recurrent nasal inflammations with sufficient bulging to impinge upon any of the turbinal bones; in acute recurring inflammations of the accessory sinuses where the deviation prevents adequate drainage and proper aeration. Resection is also indicated in nasal polyp, and sometimes in pharyngeal and laryngeal diseases, not as a curative measure in the latter, but for the marked alleviation of symptoms which may be thereby secured. In middle ear disease and obstruction of the Eustachian tubes resection of the nasal septum has been productive of beneficial results.

In connection with submucous resection of the nasal septum, there are a few important points in technic which will be briefly described. Opening wide the nostril of the affected side, with a sharp knife a vertical incision is made just in front of the anterior edge of the deformity, passing through the mucous membrane and perichondrium, care being observed to include the latter tissue in the incision; then with a flat, sharp elevator begin the separation of these two layers from the cartilage, continuing the elevation with a thicker and less sharp elevator until the area to be removed is uncovered; then the index finger placed in the other nostril, returning to the original incision, with a knife or sharp elevator the cartilage only is carefully incised to the opposite perichondrium. The elevation of the perichondrium and mucosa of the concave side is easily accomplished if the operator has not buttonholed the perichondrium or mucosa. After sufficient elevation has been secured, with the swivel knife, biting forceps or chisel, the offending cartilage or bone is removed, leaving in its place a septum consisting of mucous membrane and perichondrium, which will possess all the virtues originally intended.

It need hardly be stated that the operation is contraindicated in the very old, and also in the very young whose facial bones have not attained full growth; also in patients suffering from acute middle ear and pharyngeal lesions, and in syphilis, tuberculosis and other grave general diseases.

Submucous resection of the nasal septum is a much simpler procedure than perusal of the literature of the subject would lead us to believe. A general anesthetic, excepting in young children, is rarely required. The recommendation of certain operators that a general anesthetic should always be employed, represents the height of absurdity. Local anesthesia is obtained by the application of cocaine or novocaine on thin pledgets of cotton. The best results have been secured by cocaine crystals in adrenalin solution 1:1000, five or six grains of cocaine to one fluid dram of adrenalin. If care be observed that the cocaine solution does not come in contact with the turbinates or the outer nasal walls, there will be little absorption into the circulation, and hemostasis will be complete. It is impossible to properly execute the procedure in a bloody field, therefore the importance of hemostasis is emphasized. Properly performed under aseptic technic there should be neither complications nor sequelæ.

Fisher, in a recent paper, presents such an admirable summary that I am taking the liberty of reproducing it *in toto:*

"(1) The submucous operation, having but very slight risks, is indicated in all cases where the removal of displaced or hypertrophied septal bone and cartilage will restore the proper functions of the nasal chambers and their contents such as cases where there is actual mechanical blocking, or where there is interference with ventilation and drainage of the sinuses, or where pressure on the turbinates produces headaches and other reflex phenomena; it is indicated in cases of deafness and ear suppurations, where nasopharyngeal trouble traceable to the septal deformity is contributing to such deafness or suppurations.

"(2) The submucous resection is not a panacea for all ailments of the nose and nasopharynx, and before doing one, it is well to bear in mind its limitations, especially as far as reducing the deformity is concerned, in spite of extensive removal of bone and cartilage; for instance, in a case where the deflection occurs in such a high position that it is not safe to extend the resection so far; in which case it must first be determined whether the removal of that which is possible, will give a satisfactory result.

"(3) The operation is absolutely contraindicated in all cases that show presence of atrophy, and should not be done in children except as a matter of last resort.

"(4) In cases of marked hypertrophy, with or without a deviation, it is well to try a Wassermann reaction before operating.

"(5) To get a good result, care must be taken to remove every bit of the deviation, going to the very floor of the nares if necessary; but not so with the upper end of the triangular cartilage, where a sufficiently large strip must be left for support.

"(6) The submucous operation is an office operation, and can be performed readily and safely without any particular preparation of the patient.

"(7) Most of the regrets in the cases operated on, come from not having removed enough bone, rather than from having removed too much; more particularly is this true of the bony ridges along the floor.

"(8) A good submucous resection might not produce the desired results because of failure to reduce an hypertrophied inferior turbinate previous to the operation.

"(9) In acquiring the technic of the operation, it is well to learn to rely on the sense of touch as much as, if not more than, on the sense of sight.

"(10) Packing, if employed, should be loose and carefully applied, and when once removed need never be replaced.

"(11) Persistent bleeding after the removal of packing usually indicates infection, and the case should be so regarded and treated.

"(12) Serious injury to any vital parts during operation is extremely unlikely, unless extraordinary violence is employed, and whatever disappointments do arise are usually the result of excessive timidity on the part of the surgeon."

In conclusion I desire to emphasize the importance of careful nasal examinations as a routine measure, especially where there is a history of previous trauma. All so-called broken noses should be inspected both inside and out, and when in doubt it is better to use an intranasal splint than the familiar and useless piece of adhesive plaster across the bridge of the nose. If the cartilage is actually broken, the splint will maintain the fragments in correct apposition and prevent deformity from deviated septa which might otherwise result.

References:

Lewis: New York Medical Journal, April 10, 1915.
Fisher: New York Medical Journal, May 22, 1915.
Fallenger: "Ear, Nose & Throat."
Kyle: "Ear, Nose & Throat."
Thompson: "Ear, Nose & Throat."

Gastric Ulcer vs. Cholelithiasis.

In gall stones the pain is of paroxysmal type, usually coming on suddenly and suddenly disappearing. In stomach ulcer there is a sudden, sharp pain relieved by vomiting, and it generallly follows the ingestion of food. Following a gall stone attack there is a distinct soreness over the gall bladder, also a slight rise of temperature the following day. These symptoms are not present in ulcer. Vomiting is very often present in both lesions which, as stated before, relieves gastric colic and ameliorates or does not affect gall bladder colic. The pain of appendicitis is general, over the entire abdomen, but in a few hours localizing itself over the region of the appendix and becoming more or less constant in character. Vomiting is not present as a rule, but if it occurs twenty-four hours later, it is quite significant of perforation, occasionally this is not so, but more often it is present.—M. H. Cremer in *The St. Paul Medical Journal.*

Ovarian Roentgenization.

Great care should be exercised in the selection of patients for *x*-ray treatment of the ovaries. A most careful local examination should be made to exclude cases having pelvic lesions which demand surgery. Especial care should be exercised to exclude those cases in which there is even a suspicion of malignancy.—Sidney Lange in *The Ohio State Medical Journal.*

FURTHER EXPERIENCE WITH THE USE OF THE WIRE TOURNIQUET IN PARTIAL THYROIDECTOMY.

Leonard Freeman, B. S., M.D., F. A. C. S.,
Denver, Col.

Several years ago I reported, before the Texas State Medical Society, a "New, Simple and Safe Method for the Performance of Partial Thyroidectomy," by means of a wire tourniquet. Since then I have had occasion to employ the procedure fifty-six times in forty-two cases and have modified and perfected the technic considerably, so that I now feel justified in claiming that the method is a useful addition to the operative procedures in connection with goiter.

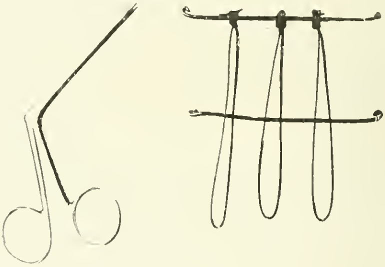

Fig. 1.

A satisfactory goiter operation should fulfil the following conditions: It should be capable of being quickly and readily done; it should not endanger the recurrent laryngeal nerves or the parathyroid bodies; and it should furnish easy and certain control of hemorrhage. I have reason to believe that the wire tourniquet does all of these things satisfactorily, and in addition enables one to remove as much or as little of one or both lobes as may be indicated, irrespective of their size.

Operative Technic.—The goiter is first exposed by a collar incision, and by separation, or perhaps division, of the sterno-hyoid and thyroid muscles (with the wire tourniquet division is seldom necessary.) After ascertaining the proper plane of cleavage, a lobe is dislocated, paying attention to the superior and inferior poles, which may project upwards into the neck or downwards beneath the upper portion of the sternum.

The lobe now lies loosely upon the side of the neck and can generally be pulled well out of the wound, thus putting upon the stretch the superior and inferior thyroid vessels and the attachments to the trachea and isthmus. Sometimes, but by no means always, these attachments form a rather well-defined pedicle.

The gland is now ready to have done to it whatever may be required—a cyst or tumor may be enucleated, the whole lobe removed, or a partial thyroidectomy done. Up to this point the operation does not differ from any of those in common use; but from now on, if a partial thyroidectomy is indicated, which is usually the case, the procedure is entirely different.

The object is so to compress the base of the lobe, including all its vessels, that any desired amount may be cut away without fear of hemorrhage or injury to the nerves or parathyroids. This is accomplished by placing a piece of wire about the size of a knitting-needle upon each side and tying these wires firmly together, thus forming a tourniquet which effectually controls *all* of the circulation, including both the superior and inferior thyroids.

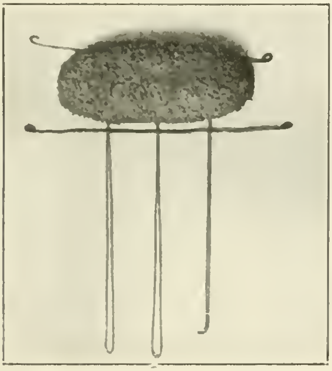

Fig. 2.

As much as is desirable of the gland may now be cut away without fear of hemorrhage, the edges of the wound brought together and whipped over with a hemostatic suture of catgut, and the wires then removed.

There are, of course, a number of points to be observed which contribute to smoothness and success:

(1). The wires should be rather stiff, but not too rigid to prevent easy bending to suit the particular requirements. Number 17 is a good size. They should be cut with a wire-cutter so that they are long enough to project beyond the gland at each pole, without being long enough to interfere too much with the surrounding parts (Fig. 3). It is well to turn their sharp ends over into a loop, which can be done in a moment with a pair of forceps, to prevent injury to gloves and tissues (Fig. 1).

(2). The cord for binding the wires together must be very strong, so as not to break under the considerable tension necessary to obtain hemostasis. The best thing for the purpose is heavy braided-linen fishingline—about No. 2 or 3. Prior to the operation three of four sections are cut from this, each about a foot in length. These are formed into loops the open ends of which are firmly tied with square knots to one of the wires—three for a smaller goiter and four for a larger one (Fig. 1). If sections are to be removed from both lobes, two wires should be prepared in this way.

(3). By means of a small pair of blunt-pointed alligator-forceps (Fig. 1) plunged directly through the glandular tissue the closed ends of the three loops are then dragged through the lobe near its base, one at the center and one near each pole, thus pulling into place the wire to which they are attached (Fig. 2). (For purposes of illustration a rubber sponge has been used to represent the goiter).

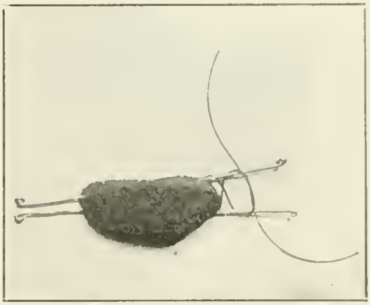

Fig. 3.

(4). Another wire is now passed through the free ends of the loops on the side opposite to the first wire (Fig. 2). The loops are then divided and tied tightly, beginning with the one in the center, thus firmly approximating the two wires to each other (Fig. 3). The way in which this tying is done is of importance, only one turn (a half-knot) usually being necessary, because the roughness of the fishline and the circumstances of its application prevent its slipping. This single turn not only saves time, but it also permits the central knot to be drawn tighter at any time if desirable.

The two ligatures near the poles should not only be tied like the one in the center, but their ends should also be wound in opposite directions around the free projecting extremities of both wires and again tied, thus giving additional security and compressing the poles more firmly (Fig. 3).

(5). The hemostatic suturing (Fig. 4) may be facilitated by making a v-shaped excision. In Fig. 4 much more tissue is left for clearness of illustration than is usually necessary. It may be better to use a double strand of fine catgut rather than a single and coarser one, and when the tissue is particularly friable or vascular it is often desirable to whip over the raw area twice instead of once. If a little care is taken at the poles it will be unnecessary to ligate the thyroid vessels separately—in fact I ceased to do this long ago.

(6). When the hemostatic suturing is finished the wires are removed. This can be done by cutting away the knots upon the side of the wire last put in place, so that the other wire may be lifted off with the remnants of the sutures attached; or the sutures may be untied from the projecting ends of the wires, which is easily accomplished, and the remaining half-knots slipped by pulling the wires forcibly apart.

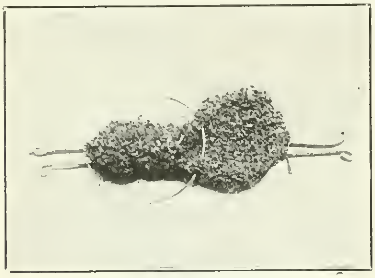

Fig. 4.

There is seldom any bleeding of consequence from the suture-holes, but if any should occur it can be checked by compression between the fingers or by a catgut stitch.

The subsequent steps in the operation are such as are usually carried out under ordinary circumstances—stitching of divided fascia and muscles, drainage, and careful union of the skin with subcutaneous sutures or wire clips.

The advantages of the wire tourniquet are several: It is easily and rapidly applied, requiring no particular skill in its adjustment and saving considerable time; it effectually controls all hemorrhage, thus obviating the necessity for crowding the field with hemostatic forceps; it does away with danger to either the recurrent laryngeal nerves or the parathyroid bodies, because it is applied at a safe distance from them, and even if they should by any chance be caught, the pressure is not great enough to permanently injure them; it compresses the goiter without crushing it, which is of importance in Grave's disease at least; and, lastly, because the loops pass through the tissue the wires are prevented from slipping during the course of the resection irrespective of the size of the remaining stump. Neither clamp-forceps nor a ligature of any kind answer the same purpose, nor can they be used except in special cases. Forceps crush the tissues objectionably if they are tightly enough applied to prevent slipping when the lobe is cut away Sutures are usually placed with much difficulty, and if tight enough to be effective, they are apt to cut through, especially if the tissues are soft and vascular. Both forceps and ligatures may crush the nerves or the parathyroids.

Those who familiarize themselves with this simple method of operating, will, I am sure, recognize its merits.

Post-operative Roentgentherapy.

When it is not practical to treat the patient through the open wound, the regular post-operative treatment should be given just as soon after the operation as the condition of the patient will permit moving to the Roentgen treatment room, which is usually in from a few days to two weeks. Even when the patient must be moved from the hospital in which they are operated upon to some other place for treatment, it can easily be done within two weeks. It is a mistake to consider Roentgen treatment as post-operative when it is first started after the patient begins to have some indurations of the tissues, some shooting pains, or other signs of recurrence.—George E. Pfahler in *The Journal of Advanced Therapeutics.*

Hare-Lip Surgery.

Most cases may well be prepared for post-operative treatment by education in feeding from the spoon or medicine dropper for several days, and in this manner eliminating post-operative action of the lip and palate muscles. Older children should be taught to cleanse the mouth frequently with mild antiseptic solutions for several days before operation.

Adhesive plaster strips may be applied for several days to coapt the cleft edges, in this manner largely eliminating post-operative tension upon the suture line. The child accommodates itself to a diminished respiratory inlet and becomes accustomed to the presence of the post-operative tension dressing.—H. P. Cole, M. D., in *The Southern Medical Journal.*

CHOLECYSTITIS.

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Two of the most prominent factors in the production of cholecystitis are (a) infection, and (b) obstruction to the biliary outflow. It has been demonstrated experimentally that virulent micro-organisms may be injected into the healthy gall-bladder without inflammatory changes resulting. If, however, obstruction to the flow of bile be produced by constricting the ducts, an intense inflammation of the gall-bladder ensues.

In clinical practice it has been found that the chief source of infection is some portion of the alimentary tract. The micro-organisms are carried by the portal circulation to the liver, and, some of them escaping the bactericidal influence of the liver cells, are wafted by the bile stream into the ducts and thence to the gall-bladder. If there be an obstruction to the free flow of bile from the liver, or from the gall-bladder to the intestinal tract, then infection will occur. The lesions involving the intestinal tract which are most likely to produce cholecystitis are (a) typhoid fever, and (b) appendicitis. Gastric and duodenal ulcers claim a certain percentage of cases; acute catarrhal processes in the intestinal tract may likewise be a course of infection; and infection may also occur through the systemic circulation, and it is possible that some of the cases of cholecystitis subsequent to typhoid fever originate in this manner, the germs being carried directly to the mucous membrane of the gall-bladder through the cystic artery and its terminal branches. Again, infection may travel upward through the duct from the duodenum against the bile current which has been retarded by some obstructive process. Extension of inflammation to the gall-bladder from contiguous organs is a comparatively rare occurrence.

Obstruction to the biliary outflow may be produced by swelling of the mucous membrane of the duodenum, by enlargement of the head of the pancreas, by malignancy, etc., and by adhesions resulting from gastric or duodenal ulcer, or other inflammatory lesion in the upper abdomen. Adhesions by constricting the ducts interfere with the free flow of bile. Cholecystitis is much more common in women than in men, the reason being, perhaps, distortion and relative displacement of the upper abdominal organs; tight lacing and frequent pregnancies by producing pressure upon the bile passages, are common causes.

In many instances it is impossible to determine whether there exists a cholecystitis with stones or without stones, and in this paper no attempt will be made to treat the two conditions separately, since in gall stones the principal symptoms are due to the accompanying cholecystitis. We know, or at least we believe, that cholecystitis is the principal factor in the production of calculi, and that on the other hand when once present the irritation produced by calculi will cause cholecystitis. There is thus a true vicious circle in the generation of biliary calculi. The two conditions are so intimately connected that it is unwise, at least clinically, to attempt to differentiate them.

It is surprising that many physicians may still be found who are unwilling to make a diagnosis of gall bladder infection unless the classical symptoms of pain, vomiting, and jaundice, are present. In the majority of cases these classical symptoms are not present, therefore we can no longer hold to this tenet. The most constant manifestations are those referred to the digestive tract, and it has been conservatively estimated that of all adult patients complaining of gastric symptoms, in at least ten per cent. these are due to cholecystitis. The gastric symptoms are sometimes distressing, there being noted pain, eructations of gas, nausea and vomiting. These symptoms occur during or soon after eating. The indigestion is qualitative rather than quantitative, i. e., the symptoms appear after the ingestion of certain articles of diet. It is quite common for patients to select a special diet for themselves, experience having taught them that they may eat certain kinds of food with impunity, whereas they must sedulously avoid certain other articles or pay the penalty for their indiscretion with an attack of indigestion. Some of them cannot eat sweets, others must avoid fruits; many of them cannot eat substances containing much fat or grease.

The cause of the gastric symptoms is not far to seek. When we consider that the pneumogastric nerve, in addition to supplying the stomach, sends filaments to the gall-bladder, and when we consider the intimate relation in which these organs are held by the so-called sympathetic nervous system, we can readily understand how the gastric symptoms may result in an entirely reflex way In addition to this, in cholecystitis certain changes occur in the composition, reaction and alkalinity of the bile; this changed or modified bile destroys the normal balance and relation between the alkalinity of the duodenum and the acidity of the stomach, thus interfering with proper functional correlation. It must be remembered that the pylorus opens and permits the acid contents of the stomach to escape into the duodenum, that it then closes and remains closed until the duodenal acidity is overcome by the alkaline secretion of its mucous membrane and the presence of bile. If the alkalinity of the duodenum is reduced, the contents will remain in the stomach longer, the pylorus will become more and more contracted, and at times pylorospasm results.

In many cases of cholecystitis definite changes occur in the pancreas, especially when the bile ducts are involved. They sometimes occur, however, when the gall-bladder alone is involved. The lymphatics along the bile ducts drain the head of the pancreas, and if these glands become enlarged to such an extent that the lymphatic stream is blocked, changes occur in the head of the pancreas (lymphedema) with subsequent alteration in its secretion.

In the earlier stages of cholecystitis it is the rule to have an excess of acid secretion in the stomach (hyperacidity). In extremely chronic cases, however, there is a lowered acidity of the gastric contents.

The pain of cholecystitis varies in severity from a mild epigastric discomfort to the most excruciating pain of gall-stone colic. In many cases of cholecystitis of the mild and chronic types, pain is practically a negligible quantity. In acute attacks pain is of two distinct types. One is a severe, aching, persistent pain due to inflammatory changes in the gall-bladder walls and to distension. When the process becomes more severe and involves the peritoneal coat of the gall-bladder or the peritoneum of the surrounding structures, the pain becomes very intense. In neither of these types is the pain colicky in character. The so-called biliary colic seems to result only from the passage of solid or semi-solid material through the ducts. Pain is located in the epigastrium and right hypochondrium, and radiates in many cases to the right subscapular region. It may extend upward into the neck and down the right arm. There is usually a point of tenderness posteriorly—at the border of the eleventh vertebra about two inches from the spinal column. In the milder types there is little or no tenderness nor rigidity over the gall-bladder. When the attack is more severe and especially when the inflammation extends to the peritoneum, there is pronounced tenderness and marked rigidity in the right hypochondrium. When the gall bladder becomes markedly distended (hydrops, empyema) the enlargement may be distinctly palpable. As a rule fever is not present in the chronic cases. With acute exacerbations the temperature rises. However, high temperature with pronounced irregularity, i. e., sharp ascent and decline, does not occur in inflammation limited to the gall-bladder (as it does in duct involvement), and the process may extend to gangrene of the viscus without the development of high temperature. The fundus of the gall-bladder is not very rich in lymphatics, therefore the absorption of toxic material is not great and the temperature does not reach a high point. As the neck of the gall-bladder is approached the lymphatic supply is more abundant, absorption is more rapid, and consequently the temperature is high and approaches the more pronounced irregularity that is seen in inflammation of the ducts.

Jaundice is seldom observed in cases of pure cholecystitis, either with or without calculi, and when jaundice is present it indicates either that the ducts have become involved in the inflammatory process, that a stone has lodged in the hepatic or common duct, or as rarely occurs that the lymphatic glands located at the junction of the cystic and hepatic ducts have become so enlarged that pressure from without causes obstruction of the ducts and jaundice results.

When a patient suffers from gastric disturbance, it is oftentimes difficult to determine whether the symptoms are due to a lesion of the stomach, to a lowered condition of the general health, to a neurosis, or to some distinct lesion within the abdominal cavity. In such a case it is necessary to obtain a careful history of the patient, noting the various symptoms and lesions which have occurred in the past, the time of appearance of the manifestations, the duration and regularity with which they occurred, their intensity and the manner in which they were relieved.. When gastric disturbances are present many physicians look upon the gall bladder as the source of the trouble only when infection and pain occur.

In the differentiation between cholecystitis and gastric or duodenal ulcer the following points are important: In gastric and duodenal ulcer periodicity is the rule, the attack persisting for days or weeks; work, worry, exposure, and infection, may provoke an attack; it is accompanied by pain, the formation of gas, sour eructations, and vomiting. The history will show that the affection is distinctly chronic, that it has probably persisted for years, and that the attacks have increased in duration and severity. The spring and autumn are favorite times for the onset of an attack. Pain and distress are the most common symptoms, being present in ninety-five per-cent. of cases. Intense griping pain or colic is present, and in severe types opium is required for relief. The pain is located for the most part in the epigastrium, and radiation is uncommon in uncomplicated cases. When radiation occurs it may be suspected that the ulcer has extended to the peritoneum, or that some other lesion, such as cholecystitis, appendicitis, or renal infection is the cause. It is the time when pain occurs and its control that are characteristic and diagnostic. The pain occurs from one to three or four hours after eating, and is relieved by the taking of food, by the administration of alkalies, by position and rest. This is untrue of the gastric symptoms produced by cholecystitis, pain being worse at intervals but seldom entirely absent.

Graham has tersely described gastric symptoms in this way: "In the diseases which oftenest cloud the diagnosis, such as chronic cholecystitis and chronic appendicitis, we obtain our greatest diagnostic aid from the wide irregularity of symptoms during the period of attack. Yesterday pain came before meals; today, after meals; tomorrow pain may be an all-day miserable feeling; food-ease yesterday becomes food-pain today; the food-pain is wholly reflex; vomiting one day, and gas another; yesterday, well—today, in the depths mentally; nothing follows in sequence day by day because the stomach behaves properly unless irritated by the distant lesion, and this external lesion is irregular in its influence. The stomach then delivers what symptoms it may when the irritation is great enough."

The gastric symptoms in cholecystitis make their appearance either during or immediately after meals, differing in this respect from those due to chronic appendicitis or intestinal kinks, where the symptoms are due to interference with peristalsis in the small intestine. In the latter two conditions the gastric symptoms usually appear from one to two hours after taking food. In chronic appendicitis there is usually hyperchlorhydria, whereas in prolonged cholecystitis there is lowered acidity. Here again the history will be of great service. In appendicitis there will probably be a history (possibly years before) of a distinct attack of appendiceal inflammation. In intestinal kinks there will be a history of some antecedent disease which might produce adhesions. Acute attacks of cholecystitis accompanied by fever may simulate acute appendicitis or acute infection of the right kidney and ureter. Indeed, it may be impossible to differentiate between acute appendicitis and acute cholecystitis when the appendix occupies a high position. The leucocytosis in gall bladder inflammation is not as high as in acute appendicitis, nor does it appear so quickly. In acute surgical lesions of the right kidney examination of a catheterized specimen of urine from that kidney will usually give evidence of the renal disturbance. In kidney lesions pain is more likely to be in the back radiating to the front of the abdomen, to the groin, the thigh, etc., whereas in cholecystitis it is in the right hypochondrium and radiates to the back.

In chronic cholecystitis the exclusion of purely functional gastric disturbances and neuroses may at times be exceedingly difficult. The stomach stands in intimate relationship to a number of organs through its sympathetic connections, and reflex disturbances involving any of these organs may excite gastric symptoms. General impairment of health from constitutional or infectious diseases may likewise cause gastric symptoms. All of these must be eliminated in arriving at the diagnosis.

In the neurotic patient the symptoms may simulate cholecystitis one day, gastric disturbance the next, appendicitis the next, etc., and these are all silhouetted against a general neurotic background. The more the symptoms overlap the greater the probability of a pure neurosis and less the relief that may be promised by surgical intervention.

Based upon the clinical signs the diagnosis of cholecystitis either with or without calculi is not always easy of accomplishment. As already suggested the classical symptoms—pain, vomiting and jaundice—may be absent. Too great emphasis has hitherto been placed upon the diagnostic importance of icterus which if present is usually a late symptom merely indicating the supervention of obstructive lesions. Epigastric pain is a fairly constant symptom, and palpation elicits a special point of tenderness over the gall-bladder region. Muscular rigidity is seldom noted unless obstruction to the biliary outflow and considerable distension of the gall-bladder have already ensued. The normal gall-bladder cannot be palpated, nor is it possible by this method in the majority of cases to definitely determine the presence or absence of calculi unless the gall-bladder has become markedly enlarged. "The clinical diagnosis of cholecystitis, even when stones are present, is not always easy. With the palm of one's hand an area may be covered which could be involved in pyloric and duodenal ulcer, disease of the gall-bladder, appendicitis, stones and infection of the right kidney or ureter." The pain produced by small dermoid cysts and extra-uterine pregnancy may also be referred to the gall-bladder region. The importance of obtaining a careful history of the patient has already been mentioned, and consideration of the antecedent history may be of greater diagnostic assistance than present clinical signs. It cannot be too frequently reiterated that the most constant indicative symptoms of cholecystitis are disturbances of digestion.

If after exhausting all available resources the diagnosis remains doubtful, exploratory celiotomy should be performed, especially where the symptoms become distinctly surgical in their significance. It must be remembered, however, that the milder degrees of cholecystitis are amenable to medicinal treatment, which consists of rest, a diet so regulated as to not produce any symptoms of indigestion, and careful attention to elimination. "Cholecystitis without stones is comparatively a common disease. The types vary in intensity from the mild, chronic catarrhal, to those characterized by necrosis of the mucous membrane, perforation, and other manifestations of severe bacterial infection. Cholecystitis is often associated with appendicitis (chronic) especially those forms in which foreign bodies, especially fecaliths, are present. Infective material from appendicitis may be picked up by radicals of the portal circulation and carried to the liver and there destroyed or excreted in a modified form with the bile. When such bile is delayed in the gall-bladder, cholecystitis may result."

In regard to the surgical treatment of cholecystitis, there is a wide difference of opinion. In cases where calculi are present, and where damage to the gall-bladder is not very extensive, relief may be expected to accrue from removal of the stones and drainage of the gall-bladder. Mayo claims that ninety per cent. of cures may be obtained by operation in such cases. If there has occurred extensive damage to the gall-bladder wall, i. e., if it has become thickened or fibrous, cholecystectomy is the better procedure. In all cases of cholecystitis with or without calculi where the so-called strawberry gall-bladder is found, cholecystectomy is indicated. In cholecystitis uncomplicated by calculi drainage does not afford the permanent relief that it does where stones are present, and many patients of this class after a few months again present gastric symptoms. According to Mayo fifty per cent. of cases are not permanently relieved by drainage. If, then, there is sufficient evidence to warrant an operative procedure upon the gall-bladder in cases of simple cholecystitis, cholecystectomy would appear to be the most logical procedure. However, the question is in an unsettled state, and the final verdict has not yet been reached.

Mayo states that chronic cholecystitis produces two types of gall-bladder: (a) large, blue, distended, which does not empty itself normally under compression; bile thin and foul-smelling: (b) thick-walled, whitish gall-bladder, often adherent; thick tarry bile mixed with mucus. Enlarged lymphatic glands are the rule in both types. If the symptomatic evidence that cholecystitis is present is characteristic, the gall-bladder must be opened. Sometimes the pathology is limited to a small area, but this cannot always be determined until the gall-bladder is incised. The so-called "strawberry gall-bladder" is one of the most frequent types. The disease is strictly confined to the gall-bladder, and the ducts if involved show only a catarrhal process. Radical operation cures because the ducts are not exposed to traumatism as in the presence of stones. "The milder degrees of cholecystitis when subjected to operation will not present a high percentage of cures, and under existing conditions should usually be considered medical rather than surgical." Practically all cases of cholecystitis and eighty per cent. of cases of gall stones should be treated by cholecystectomy according to the views of Mayo.

The ultimate results of gall-bladder surgery are not always satisfactory, in a certain percentage of cases the symptoms either persisting or recurring shortly after the operation. The persistence or return of symptoms may be due to the presence of calculi overlooked during the operation, to obstructive adhesions, or to the actual formation of additional calculi. In the majority of instances, however, the so-called "recurrent gall stones" are probably calculi overlooked at the original operation. The most unsatisfactory results are obtained in cases where no calculi are present, the operation revealing an inflammatory obstruction of the bile ducts with marked distension of the gall bladder from accumulated muco-purulent material. While incision and drainage would seem the ideal procedure under such circumstances, the ultimate outcome is oftentimes unfavorable, and permanent fistulæ have been known to occur. In this type the results following cholecystectomy may also be far from satisfactory in certain cases, although this operation is preferable to incision and drainage.

There is one class of patients upon whom, regardless of the character of the pathology and symptomatology, surgical intervention is usually unproductive of permanent beneficial effect, i. e., neurasthenics, and in this type operation is inadvisable excepting as a *dernier ressort*. As Griffin aptly remarks, "It has not been sufficiently appreciated that a neurasthenic individual, who complains more after operation than he did before, may prejudice literally hundreds against what might be to them a beneficient treatment."

Under no circumstances should cholecystectomy be performed during an acute attack of cholecystitis with or without calculi; for obvious reasons it is advisable to await subsidence of the acute symptoms.

FLEXION DEFORMITY OF THE KNEE. AN IMPROVED METHOD OF CORRECTION.

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Flexion deformity of the knee is a very common deformity. It occurs in the course of any inflammation in the knee whether rheumatic, gonorrheal or tuberculous.

Flexion rarely occurs alone; it is usually associated with posterior subluxation of the tibia. The backward pull of the hamstring tendons, especially the biceps, is responsible for this. The diagram (Fig. 1) made from the x-ray picture shows this clearly. Efforts at correction of the flexion deformity by the usual methods must result in the production of a posterior subluxation, or if already present must increase it.

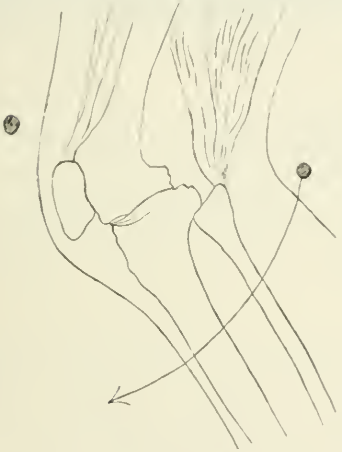

Fig. 1 Flexion deformity sketched from x-ray picture. Cross bars shown in section. Arrow indicates direction of force applied.

A method for correcting this deformity must be effectual and simple. It must really reduce the posterior dislocation while it is also extending the knee; and the apparatus used should be inexpensive and easily procurable.

The method here described fulfils these conditions. It is positive in its action, it requires the fewest assistants and the least amount of physical force. The materials can be procured at trifling expense at any hardware store. (Fig 2) They are two rods of Bessemer steel, ½ inch in diameter and 14 inches long, 2 dowels (birch wood) 1 inch in diameter and 2½ feet long, one steel bar may be bent at both ends to prevent slipping of the dowel. The dowels may also have a ½ inch screw-eye placed at one end, to give the dowel a firmer hold on the upper cross bar.

A circular plaster of Paris dressing or cuff is first applied to the thigh and another to the leg leaving an open space about 2 inches wide at the knee joint. (Fig. 3) Great care must be used in padding these dressings. A thick piece of felt is to be placed on the anterior surface just above the patella, and another piece of felt on the posterior surface near the buttocks. The lower dressing has one pad under the popliteal space and another on the front of the leg just above the ankle.

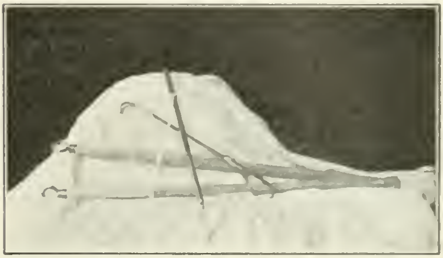

Fig. 2. Details of apparatus. [illegible] ew eye at one end of each bar. One straight steel rod 14 inches long. One rod curved at the ends.

We incorporate two bars into the dressing, one just above the knee cap in front and one just below the popliteal space in the back. The straight bar is placed in the upper cuff, the one with both ends curved is placed in the lower cuff as shown in the photograph (Fig. 4).

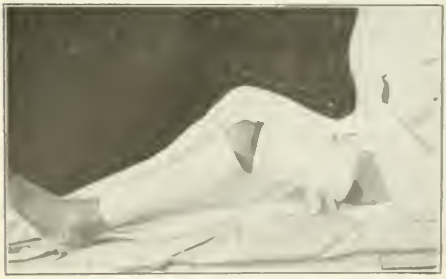

Fig. 3. Two [illegible]

A day is allowed to elapse for the plaster to harden The patient is then anesthetized and the stretching is done.

This is accomplished in the following manner. The two wooden dowels (or broom handles) are placed in the position as shown in the illustration, (Fig. 5) one dowel on the outer and one on the inner side of the knee, bearing on the upper cross bar, and caught under the lower bar.

An assistant then holds down the thigh or it may be tied to the table. The operator now pulls up on the two dowels much as one would hold up the two handles of a wheelbarrow, pulling up slowly so that the hamstrings may stretch. The amount of leverage obtained is very great, enabling one to accomplish a great amount of correction with very little effort.

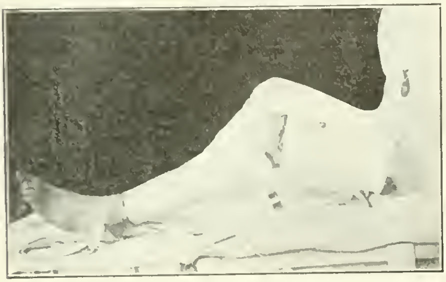

Fig. 4. Showing steel bars in place.

When the desired amount of correction has been obtained a nurse or assistant can hold the stretching bars to keep this corrected position, and a plaster of Paris bandage is applied over the open space at the knee joint thus connecting the lower with the upper cuff (Fig. 6).

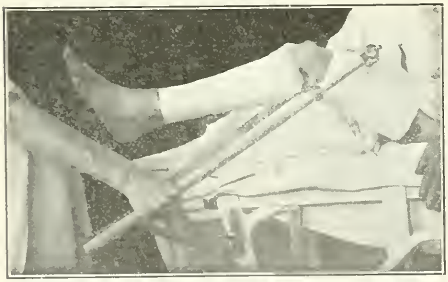

Fig. 5. Wooden rods in position; operator ready to begin stretching.

The application of this bandage is very easy because the long cross bars above and below the knee allow the stretching dowels to be held far apart, giving wide space all around the knee for the bandage to be applied.

The diagram (Fig. 1) shows how when the apparatus is used the tibia is drawn down and forward, the pressure being exerted on the head of the tibia in the direction shown by the curved arrow. This arrow is part of a circle having its center at the upper cross bar its radius being the distance between the upper and lower cross bars.

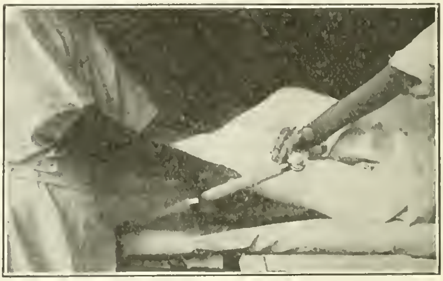

Fig. 6. Stretching is finished. Assistant holds down thigh; a nurse is holding up the wooden rods; operator is applying the plaster of Paris bandage.

The pressure made as indicated tends to draw the tibia downward from the femur and also forward to correct the posterior deformity.

I have used this method of stretching for the past eight years and have found it to be very satisfactory.

Trauma Following Goiter Operations.

All surgeons know of the evil effects of operative trauma, and all that applies in other fields is apparent in trauma following goiter operations, with the additional danger of increased absorption of the secretion which is squeezed from the gland by rough handling. Blood escaping from the gland should not be allowed to flow over the tissue which has separated, and as the operation proceeds salt solution packs should be advanced with the line of separation. As few instruments should be used as possible, and all large vessels should be ligated at once. Every tissue should be handled as gently and as little as possible. The gland itself should be handled with the greatest care. As little hemorrhage as possible should be had. Our first efforts should be directed towards ligation of the superior vessels, and all large arteries and veins should be ligated or cut between forceps. The patient should be placed in position with head elevated about 60 degrees. Shock should be obviated in every way. Of course, trauma, hemorrhages, prolonged anesthesia and operation all tend to produce shock, but other things, if obviated, would tend to minimize it; namely, correct preparation of patient.—W. L. Crosthwait in *Texas Medical Journal Red Book.*

CARCINOMA OF THE JAW.

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Five years experience as assistant surgeon in a hospital service to which an unusually large number of cases of carcinoma of the jaw and mouth are admitted has led me to the conclusion that early diagnosis of malignant disease in this region is not made as frequently as it is in some other parts of the body. It has also engendered the belief that there is need for more thorough operations than are generally performed in well-developed, though still comparatively favorable cases. In such cases incomplete operations fail to do good, often do harm by stimulating the neoplasm to more rapid growth, subject the patient to a certain degree of immediate danger, and furthermore are very liable to discredit surgery.

Concerning the first of the propositions above set forth, it may be stated that failure to recognize incipient carcinoma of the jaw may perhaps be due to its relatively infrequent occurrence, so that physicians do not see the disease here as often as they see it elsewhere and consequently are not very familiar with its early characteristics and its mode of evolution. Diagnosis will be much simplified if it be borne in mind that practically all cases of carcinoma of the jaw begin upon the epithelial coverings of the bone and that lesions there situated which do not heal kindly after the removal of any detectable causes of irritation and the application of simple remedies are almost surely malignant. Lesions within the mouth are easily accessible. They can be exposed and examined thoroughly and if desired a piece of tissue can be removed for microscopic examination. The early removal of such suspicious lesions with the knife will save many patients from dangerous and mutilating operations later, which at best cannot give so good a prognosis as safer and less extensive procedures more opportunely performed. Particularly is this true of indurated ulcers. Unfortunately, carcinoma beginning in the antrum cannot be diagnosticated so easily. Severe maxillary pain for which no adequate cause is determinable, accompanied by edema of the nasal mucous membrane and nasal hemorrhage, should arouse suspicion of its presence. Primary central carcinoma originating in the substance of the bone is very rare and can develop only from remnants of embryonic dermal structures. Often it will be well developed before it can be diagnosticated.

The usual history of our patients was to the effect that they first became aware of a sore spot or erosion in some part of the mouth, to which they paid little attention until increasing annoyance led them to seek medical advice, and then in many instances at least, that they were subjected to some method of treatment which had no beneficial effect whatsoever. And so they kept getting worse instead of better, going from one doctor's office or dispensary or hospital to another, until finally they landed in Blockley, often at a stage in their disease when nothing could be done except to assuage the acute suffering attendant upon their last days. The trouble frequently began around the last molar tooth, though in many cases it originated further forward along the alveolar process, and in a few cases it apparently began in some other part of the mouth and extended to one of the jaws. Thus two patients first noticed a lesion on the lip and one on the floor of the mouth. Very often the patient thought that a tooth was diseased and had it extracted. In such cases healing failed to take place.

From these considerations it is apparent that much good will come from teaching the laity to understand the possible inherent danger of an apparently trival lesion of the mouth or jaw which fails to yield to a brief course of treatment, and also from further impressing the importance of such lesions upon physicians and dentists.

One great mistake has been to assume that many cases of carcinoma were syphilis, especially when a positive Wassermann reaction was reported. Some of our patients with far advanced carcinoma gave the history of having had one or more injections of salvarsan at a time when the carcinoma was operable.

That tertiary syphilitic lesions of mucous membranes may furnish the source of irritation which produces malignant cell proliferation is not to be doubted. Twice I have seen carcinoma develop upon leukoplakia in patients who gave a syphilitic history. What I wish to emphasize here, however, is that the two diseases, syphilis and carcinoma, may attack the same person quite independently of each other and that the one should not be mistaken for the other. If a lesion of doubtful nature in a patient giving a history of lues or having a positive Wassermann reaction does not yield promptly to antisyphilitic treatment, then it should be removed by the knife. A single injection of salvarsan will usually make a profound impression upon it if it be specific.

So far as epulis is concerned, the fibrous kind, which is exceedingly rare, has little about it to confuse one in making a diagnosis. It is a well-defined tumor of uniform consistency, covered by unimpaired mucous membrane, and appears on the alveolar process, usually in the region of the incisor, bicuspid, or first molar teeth, sometimes between the incisors, but almost never behind the last molar where carcinoma so often begins. The sarcomatous epulis, though more vascular and more rapid in growth, does not ulcerate until it has attained such a size as to impede the circulation in its overlying mucous membrane, or until the teeth irritate it and produce mechanical ulceration. This form of epulis will slowly invade the body of the bone, although the statement is sometimes made that it remains confined to the alveolar process.

Actinomycosis, usually beginning around a carious tooth, gives rise to an indurated swelling in the contiguous parts of the jaw and face, and if the patient is seen before the formation of fistulae, one might suspect a malignant condition. Its duration, the absence of extension upon the mucous membrane, together with freedom from lymph-node involvement at the time when marked tissue changes exist in the maxillary or mandibular regions, all help in differentiating it from malignant disease. Recovery of the ray fungus from the lesion within the mouth and the eventual formation of discharging fistulae in which these fungi are also found make the nature of the case plain.

Tuberculosis of the jaw is very rare and hardly enters into the question of diagnosis. It is characterized by progressive molecular destruction of the bone, unaccompanied by inflammatory involvement of the superjacent mucous membrane, and unassociated with pain.

With reference to the treatment of carcinoma of the jaw, it may be stated that want of faith in the power of surgery materially to arrest the progress of the disease is an evil which must be overcome before the best results can be obtained. Often has it happened that patients with distinctly operable neoplasms have been advised against operation on the ground that their disease was so far advanced that it could not be entirely removed, or that it would return if removal were undertaken. They were told that they might just as well be saved the stress and danger of a surgical intervention which would have no permanent effect. Of course, this last statement is true with regard to very late cases, but it certainly does not apply to any case in which there is a reasonable chance of completely removing the neoplasm, even though its removal entail an extensive mutilating operation. Naturally the experience of the individual surgeon will be one of the factors in determining whether a case is operable as far as he is concerned.

It has been our experience also in hospital and private practice that patients themselves will often refuse operation at a time when the chance of cure is very fair and then be willing to submit to it later when it can do them no good. In some instances of this kind they make the decision by the exercise of their own judgment or from personal feeling in the matter; in others they are evidently influenced by previous pernicious advice.

The work of a few surgeons, notably Dr. William J. Roe, my chief at the Philadelphia Hospital, and Professor Tavel, of Bern, stands preëminent in this field of surgery. Both of these gentlemen have patients now living and well, who were subjected to the most extensive operations six, seven, eight or ten years ago, and Professor Tavel has some who have gone much longer without any trouble. When I was visiting in Bern in 1909 and first became familiar with his work he told me that he had one patient on whom he had operated fourteen years before, removing practically one-half the face, both the soft and hard parts, and making a block dissection of the tissues of the neck on the affected side, who had remained absolutely free from recurrence. One of Dr. Roe's patients from whom he removed the superior maxillary, malar, nasal and palatine bones, together with the pterygoid process and septum of the nose, and also enucleated the eye, is now well and free from recurrence after ten years. Such cases as this show what it is possible to do by good surgery in a certain, even if small, percentage of advanced cases.

In preparing this paper the cases of 36 patients have been studied. All were in men except one. In twenty cases the mandible was affected, in thirteen the maxilla. In three it was impossible to ascertain which bone was affected first, for the disease was far advanced when the patients were admitted, involving mouth, face and neck, and no adequate history could be obtained as to its initial site. One of the patients was moribund when admitted. According to the patients' own statement, their trouble began at periods varying from three months to two years prior to the time they came under our observation. It is probable, however, that in some cases it had been present longer than the patients had been aware of. Of these thirty-six patients primary operation was done upon ten and secondary operation upon one other who had been operated upon several months before in another hospital. Seven others who had been treated surgically elsewhere were also admitted to our service, but with one exception their condition contraindicated further surgical intervention. One patient among this number, whose condition was favorable for another operation, remained in the hospital only one day. Of the remaining eighteen patients five refused operation, the condition of one being very favorable and that of the other four comparatively favorable. Thirteen were inoperable at the time of admission and all died in the hospital at times varying from twenty-four hours to three and four months.

After the primary operations there were two immediate deaths. Another patient succumbed nine days after operation and one more of the number six weeks after operation. One died of recurrence eight months after operation. One patient operated upon in October, 1909, died of recurrence in July, 1915, five years and nine months after the operation. His life was materially prolonged by surgery. One other died from recurrence, but the exact time of his demise could not be learned. One is free from recurrence five years after operation. One is free from recurrence four years and seven months after operation. One operated upon in February, 1915, is still in the hospital, having had two plastic operations. The wound inside the mouth is not quite healed.

Seven others who had been treated surgically elsewhere were also admitted to our service, but with one exception their condition contraindicated any further surgical intervention.

It must be admitted that this is a drab colored record showing, as it does, that all of the patients except two finally succumbed to the ravages of their disease. It is not, however, without a bright spot, for analysis of ten cases in which primary operation was done shows that two patients have passed the four year limit and that one of them has gone beyond the five year limit. Of course, no one can say when carcinoma is cured and in these two cases recurrence may eventually take place. The patients' chances for continued good health, however, seem fair. In comparison with certain series of cases which have often been quoted our percentage of late freedom from recurrence is high. For example, in forty-nine cases collected from various sources by Martens only two patients remained free from recurrence at the end of three years, and of twenty-three cases at the Breslau Clinic not a single patient remained free as long as three years.

It is not improbable that a series of thirty-six cases occurring in private practice would yield more favorable results than this series of hospital cases. As above stated, five patients whose condition was relatively favorable refused operation. Among the better class of patients it is very likely that some so affected might have accepted operation. Moreover, thirteen were absolutely inoperable upon admission. It must not be forgotten, however, that there was a time in the evolution of their disease when each and every one of them was a good surgical subject, and that if they had been more fortunately placed in the social scale, some of them at least might have secured the benefit of more intelligent advice and better treatment than it was their lot to obtain.

So far as the technic of our method of operating is concerned a few words will suffice—everything diseased is to be removed unless its complete removal entails the destruction of vital structures. In some cases integument, muscle, bone, blood vessels and nerves will all have to be ruthlessly cut away. Such operations are not the kind for timid operators to undertake. Preliminary ligation of the external carotid is invariably practised and not the slightest harm has ever been known to result from it. In addition to controlling arterial bleeding during the operation it lessens the liability to secondary hemorrhage. Venous bleeding from the pterygoid plexus is apt to prove very troublesome, and, of course, the superficial veins as well as some of the deeper ones which pass through bony foramina will also bleed. When the lymphatics of the neck are involved block dissection is made. As the operation is a long one, it is very necessary that the patient shall not be deluged with ether. In fact just a sufficient degree of anesthesia should be induced to make him insensible to pain and to keep him from resisting. If he begins to come out it is easy to give him a little more ether. In this kind of surgery the ideal anesthetist is the one who can carry the patient along quietly under light anesthesia for an hour and a half to two hours or even longer if need be and then have him in such a condition at the completion of the operation that he will begin to mumble or talk as the dressing is being put on or as he is being wheeled out of the operating room. We have had a few internes at Blockley who could do this. In many cases it will be possible to close the wound at the time of operation. In others one or more plastic operations will be required.

It is believed that careful observance of the principles expounded in this paper will do considerable to lessen the incidence of carcinoma of the jaw and also accomplish something in reducing its mortality. Naturally the most is to be expected from prophylaxis and the prompt removal of incipient suspicious lesions. For the latter I make an earnest plea.

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URETHRAL STRICTURES.

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The treatment of passable strictures is conducted either by dilatation, or by a cutting operation, the latter by either internal or external urethrotomy. Dilatation is the treatment of choice for all strictures, even though a small bougie, or sound, must be used at first, and the caliber gradually increased and the stricture gradually dilated. This operation should be repeated every few days. If the intervals are too short, the urethra may become irritated, and spasm be induced, and the lumen of the canal temporarily diminished in size due to traumatic inflammatory swelling; but by keeping the patient quiet for a few days on a restricted diet, and the bowels well opened, the spasm will soon disappear. Should time be an important factor, rapid dilatation may be employed by passing several sounds, each of a size larger than the preceding one, at one sitting; or continued dilatation may be resorted to by keeping the patient in bed, and tying a small instrument in the urethra for forty-eight hours, after which time it should be removed, and a sound of larger caliber introduced.

The plan of forcible dilatating has few if any advantages. It consists in passing through the stricture an instrument which has two shafts, and may be divided by a thumb screw at the top; thus the scar tissue is divided or torn by forcible dilatation. The danger of this treatment lies in the great tendency—when cicatrization is complete—to form even a more dense, or impassable scar. But which ever one of these methods is adopted, it is essential that the physician and the patient keep ever at it, and that the sounds be passed repeatedly and at regular intervals; otherwise the treatment will be of no avail.

The treatment for obstinate, deep, tense strictures is urethrotomy, either external or internal. External urethrotomy is the ideal cutting operation for deep urethral strictures because this treatment restores the urethra to its normal condition. It has frequently been undertaken, and with great success, in strictures of the deep perineal portion of the urethra. It is not so satisfactory in the penile urethral strictures. Internal urethrotomy is performed by passing an instrument through the stricture and dividing it from behind forward, or from before backward. The instrument of choice certainly would be one that meets all the requirements for entering the smallest as well as the largest strictures; it should be provided with a filiform bougie to penetrate the smallest strictures, a shoulder to rest upon the strictures, and a flat base just above the stricture to facilitate an easy opening of the urethra in open operations.

A few years ago all strictures of the anterior urethra were cut. To-day this is rarely done, chiefly owing to the teachings of Oberlander, and to a better perception and continuously increasing knowledge of careful dilatation. A dilatation of a stricture done once only, stretches it, and allows an instrument of accurate size, according to that of the scar, to slip through, but in order to benefit or increase the lumen, its continuity must be broken; or the scar must be replaced by an elastic, flexible, soft and absorbable material. A sound, or a bougie in the urethra exerts a dynamic influence, according to Oberlander. It induces retrograde metamorphosis, with a reconversion of fibrillary tissue into the ordinary small cell deposit, permitting an absorption of the scar. It has been suggested that the cells of the infiltrate are rendered soluble, or peptonized; and again that absorption is favored by a teasing, or tearing apart of the cells, as is the theory of Bier's artificially induced hyperemia.

The instrument which I think fully meets all the requirements is the one devised by Young. It is so constructed as to permit the operator to pass the knife down to the seat of the stricture without damage to the anterior urethra. It is provided with some mechanical means of informing the surgeon when he has completely divided the scar, thereby avoiding damage to the underlying portion of the urethra. The urine should be neutral because the acid, or alkaline crystals cause an irritation of the mucous membrane, resulting in an excessive deposit of scar tissue. Then after the urethra has been thoroughly cleansed it may be anesthetized by a weak solution of novocaine. The instrument is now introduced, the filiform bougie penetrates the scar, and the shoulder of the instrument rests upon it. The knife is then drawn upward, and the scar completely divided. After carefully examining and determining that every portion of the urethra is of normal size, as measured by a bougie, a large urethral sound is passed, according to the size of the normal urethra. If the hemorrhage is profuse, a rubber catheter is passed and pressure exerted from the outside against the catheter, and in this way the hemorrhage is controlled. The catheter is left in place for 24 to 48 hours, and the bladder irrigated through it, with any of the mild antiseptic solutions. This irrigation should be done two, four or five times a day, according to the character of the urine. I recommend keeping the patient quiet, giving large quantities of water and urinary antiseptics. After the fifth day, the use of sounds of sufficient size should be begun to keep the opened stricture constantly dilated.

It must be remembered that a urethra which has once been strictured can be kept open with much less difficulty by passing a series of sounds at regular intervals than by allowing recurrences of the stricture interrupted by spasmodic dilatations. Inas much as the formation of a soft pliable scar requires a long time, this treatment must be continued for several months.

External urethrotomy, which consists in opening the urethra through a median incision, is necessary in deep urethral strictures which close immediately after dilatation, or are so dense that they cannot be dilated at all; or in chronic severe cystitis, which cannot be relieved by other treatment, in which case perineal drainage is indicated. If the stricture is passable, there is no necessity for an immediate operation, and urethra and bladder should be irrigated. Urinary antiseptics may be given, and the perineum prepared antiseptically; about 8 ounces of boracic solution should be injected into the bladder and allowed to remain, as this renders it much easier for the operator to determine when the bladder is entered. A staff is passed into the urethra with a small filiform bougie, and a shoulder to rest on the stricture, and a flat anterior surface to cut down on. These should be held in proper place by an assistant. The incision is made in the median perenial line, carrying the dissection carefully down so as to reach the groove in the staff behind the stricture. The knife is then brought downward following the groove, and the scar or stricture is completely divided; any fistula which may exist, are laid wide open, curetted, purified and allowed to heal by granulation.

Generally speaking, external urethrotomy is a comparatively easy operation with a guide as the above described, but in cases of tight, tortuous, or complete strictures, the operation often becomes exceedingly difficult. The method of operating will depend upon the conditions found in the examination. Under anesthesia and before beginning the operation a small bougie should be passed into the bladder, if possible, and a catheter should be threaded over it and an attempt made to enter the bladder. If the bladder has been entered, urine will escape when the bougie is withdrawn. In this manner the bougie acts as a guide for the operation. If, however, the instrument has not entered the bladder, but lies either in the membranous or the prostatic portion, or perhaps just in front of the cut-off muscle, the operator must be satisfied with a guide in the stricture or as near to the stricture as possible.

It is very difficult sometimes in a tortured urethra to find any sort of a guide which will assist one in entering the bladder, and dividing all the strictures above. It has, however, been demonstrated that a solution of methylene blue, when injected into the urethra, will penetrate and stain the canal in such a manner that it can easily and thoroughly be followed. A solution of one-fourth gram of methylene blue in fifty c.c. of distilled water is generally of the proper strength. Stronger solutions cloud the field of operation when the urethra is incised and weaker solutions do not stain the urethra sufficiently to enable the surgeon to follow the entire tortuous course. The solution is injected with an ordinary urethral syringe, just previous to the operation. It requires some attention and skill to properly introduce the methylene blue into the urethral canal, on account of certain anatomical peculiarities found in strictures. Not infrequently is there a pouch or dilatation behind, but occasionally there is one also in front of the stricture. This is due, however, to the shoving forward of the strictured portion of the urethra caused by the pressure of urine in the bladder. Or there may be distortion, with a pouch formed at either side, anterior, or posterior to the normal urethral passage. The injection should first be made by gentle pressure, and the fluid allowed to gravitate or slowly find its way through the tortuous urethra; then a little more force must be used to thoroughly fill all the pockets on either side, in front, or behind the urethra. During the entire process of injection, the penis should be brought straight up in order to straighten out the canal as nearly as possible, and thus facilitate the passage of the methylene blue into all the recesses of the strictured urethra. After the solution has remained in the urethra for a few minutes it is washed out with sterile water, and the sounds, or bougie, or a staff, preferably of the sort above-named, is passed as far as possible, and the operation is begun. The urethra is now laid open, and retracted with forceps, or silk worm gut, and the course of the canal is easily followed by the stain of the methylene blue. The easiest procedure probably is to carry the dissection down with a knife or a pair of scissors and using the methylene blue for a guide in impassable strictures. It will often be found that when the urethra is opened and the scar, or stricture incised according to above method, that the urethra is amply large enough to cover a large sound.

A case of my own clearly demonstrates the efficiency of the methylene blue as a guide.

A young man, 26 years, old who had had gonorrhea three times within one year, and prided himself very much on his ability to stop the discharge in two or three days, entered the hospital complaining of difficulty in urination, and slight retention, and had to be catherized. He left the hospital, and in the course of a month, returned with complete retention of urine. Examination showed no evidence of enlargement of the prostate gland, and it was impossible to pass a catheter. A small sound met some obstruction in the penile and obstinate resistance in the prostatic portion of the urethra. It was impossible to pass a filiform through the prostatic stricture. The patient's temperature rose to 103°, he had sweats, chills and fever, and it was necessary to resort to external urethrotomy. Under general anesthesia it was impossible to pass the smallest filiform bougie. I then injected methylene blue, as above described, and passed a staff down to the prostatic stricture. The ordinary median line incision was made down to the tip of the sound, and the stained urethra showed up very distinctly at this place, although it was impossible to follow it farther as the methylene blue had gravitated into a small passage at the right of the urethral canal. On straightening the urethra, I was able to find a small pin-hole opening, and an incision through this dense mass of scar tissue revealed considerable methylene blue which had been held below the scar. With this came a gush of bluish urine, and I was satisfied that I was in the bladder. After the scars were incised and the mucous membrance brought to the median line, I had ample urethra to cover a sound of good size.

The patient is placed in bed following the operative procedure; the perineal tube is attached by means of a glass, coupled to a piece of rubber tubing, long enough to extend over the end of the bed and drained into a glass flask, or bottle on the floor. It is well that this flask should contain a mild antiseptic solution so that the end of the tube may rest in same. In order to prevent the dragging of the tube upon the perineum, it is best to fasten adhesive plaster to same. The bladder should be irrigated twice a day, or oftener, with a mild solution of boracic acid, or any other antiseptic. It is often advisable, especially in very obstinate strictures, that a metal catheter be left or tied in the urethra, answering the twofold purpose of serving as a constant dilator and promoting irrigation. Sounds should be passed every day, or every two or three days until the perineal wound closes, which usually takes from two to three weeks. After each passage of the sound the bladder must be thoroughly irrigated with from one to three thousand solution of silver nitrate, or some similar antiseptic. Not infrequently there is a post-operative rise of temperature in the evening and on the following day, ranging from 99° to 101° F. In complicated cases with cystitis or uretheritis the temperature may go to 103° to 106°. Many times there is a pronounced urethral chill following the passing of a sound or catheter which may usually be abated by a small dose of opium; following these chills the sound should be passed less frequently. Copious drafts of water promote a flushing of the bladder, and if boracic acid, urotropin, or salol are given, they, aside from acting as mild antiseptics, will assist in preventing cystitis. After the patient is up the urethra should be kept open by repeated and systematic dilatations until healing is perfectly complete. After discharging a patient it is well to have him return in five or six weeks for examination, in order to determine if any tendency toward contraction has developed.

If any such tendency exists it will manifest itself within a few weeks, but by repeated examinations contraction may be forestalled and the patency of the urethra insured. If at the end of eight weeks after the operation a full-sized sound can be passed into the urethra, we may be reasonably sure that a cure has been effected, but even in this case an occasional sounding will never be entirely amiss.

THE EFFECT OF SCHOOLING OF TO-DAY UPON SURGERY IN THE FUTURE.

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Renan said of the Roman emperor-philosopher, Marcus Aurelius, that "his philosophy is the absolute religion, which arises from the fact of high moral conscience facing the universe. It knows no race nor country; no revolution, no discovery can change it." The motto of Chilo, one of the seven wise men of Greece, was "Know thyself." A bit of Marcus Aurelius' philosophy, "If thou art engaged in the act of picking up a pin, attend to that and that alone, then thou wilt do it well."

Twenty-five years ago little was known of the cause of sickness, bacteriology, histology, pathology, physiological chemistry; and the use and usefulness of the microscope were in an embryonic state. Suppuration and temperature were essential elements in the process of wound healing, so much so that a temperature of 100° or 101° was termed a wound healing temperature. And at a later date, after the laboratory man had made some strides, we rather looked at him askance from the surgical field, regarding him as a harmless creature of very little, if any, use to us and not to be depended upon. The diagnosis could always be made after we completed the work in a given case and that seemed to satisfy us for a time. Following a state of seeming quiesence, the laboratory man began to show us some things that sent us reeling, and from that time on developments have come thick and fast, one upon the heels of another, like the mysteries of an ever-changing kaleidoscope.

First, the infectious diseases: the organisms segregated, isolated and classified, followed by a determination of the amount of harm they were capable of doing and what conditions were most favorable to their growth, a study of their respective homes in the body, how they grew and how they gained entrance into the tissues were dealt with. The bacteriologist has proven his end, and we know to-day that what is called disease is usually some form of microscopic life manifesting itself and that it is a perfectly natural scheme of nature for these pathogenic microorganisms to enter the tissues and produce disease and that they have just as certain a place in the universal arrangement of things as has man and they are constantly disputing possession of premises with him. Each organism as isolated called for some means with which to combat or kill it. The result as shown in the health records, following the incoming use of vaccines, serums, anti-toxins, and classification of surgical from medical diseases permitting surgical intervention at sufficiently early time to effect a cure, furnishes evidence of what has been done along this line. Everyone knows what has been accomplished in the treatment of syphilis.

The *x*-ray, and the cystoscope have furnished means of ocular inspection of fractures, of obstructions of the gut, of inflammatory conditions of the stomach, of gall-bladder, of duodenum, of stone in the kidney, the ureter, the bladder, and of foreign bodies elsewhere in the body together with size, contour, and position. These things have been worked out so rapidly that it almost makes one gasp for breath. The one remaining bugbear is cancer. But as a result of schooling the profession, a larger percentage of carcinoma is detected at an earlier date in its history than formerly and the result of early operation has been proved.

Now that the cause of disease has been worked out to such an extent, the popular trend of thought is directed along the lines of prevention, or the conservation of health. This line of thought has ushered into existence some good things, some foolish things, and some bad things, out of which profit is to be counted by the public and the profession, "who give thanks to the good things," and I presume the manufacturer of certain vaccines, serums and other sterilly loaded ampuls of something, and last, but not least, the politicians have some thanks to offer.

I believe the time has come when the medical profession should take the public into its confidence and school it to a further degree than the present plans contemplate. It would seem that in teaching the children of the present generation hygiene and sanitation it would be necessary to teach them first to know themselves. An elementary but sufficiently comprehensive course in medicine could be taught. They would then understand the reason for sanitation and hygiene, and would study them in their natural order. If we are to create a new structure ,and that seems to be the plan, we must first build a foundation. "If we are to be consistent, no line of treatment can be intelligently outlined until a diagnosis is made."

There is a large body of the lay community of ever-increasing intelligence interested in the new things in medicine and surgery. They are very eager to hear any little thing that pertains to the conservation of health and life. And for them the county societies could arrange to give a comprehensive course as taught the children in the public schools referred to above. All communities have the free use of the public schools for such purposes in the evenings and they should be made use of in this way. The employees of factory, department store, and other industrial concerns where large numbers of men, women and children are employed should be compelled to submit to a periodic physical examination. Such examinations should be made by men of mature judgment and men whom the county medical society would be willing to stand behind in their every act and statement. Such a plan would eliminate a great number of surgical and other conditions arising through ignorance. The results obtained would be in proportion to the amount of enlightenment acquired by the public. I am sure that goiter, enlarged glands, hernia, large tonsils and cataracts would thus reach the surgeon at an earlier date than at present.

The lay public will take to such a plan very rapidly. Note the rapidity with which those most lacking in education absorb things in and about a hospital No matter how short a time they may be confined in such an institution they pick up every little thing they hear or see and are always eager to learn more.

So much for the schooling of the layman. Now if we devote the time and energy required to school the public to the extent contemplated herein we should not neglect the schooling of the surgeon. Surgery is based first upon a knowledge of anatomy:

second, upon a mechanical mind; third, upon good sound jdugment, and last, but not least, upon honor. And the man without the last qualification, no matter how proficient he may be in the others, is a disgrace to the profession.

I liked the ring of Jona's statement in his article "Surgical Conscience." "Medical schools should be first equipped with good instructors. Men as instructors are of more importance than palatial buildings."

The old Greek philosophers always gave thanks to their tutors who schooled them first in honor. Science is based upon the fundamental principle of honesty.

Teach one to be honest with himself; then if he be honest with himself in all things, he will be honest with his fellowmen. Every game that is played has rules governing it and when I see a man or boy attempting to fudge a little while playing any game, no matter how simple it may be, then I know his schooling has been neglected or that there is some kink in his nature. Maybe he is not to blame for it, but his father or mother was responsible.

The surgeon, of all professional men, requires prolonged training in the development of reasoning powers and mental habits which render him capable of safeguarding the lives, anatomy, and other interests of those who come into his hands.

No written instructions, no matter how exact, are sufficient to educate a surgeon. The numerous details can be learned only by constant looking on and by practicing under skillful guidance in hospitals.

Indications for operations must all be learned clinically. The surgeon should be calm and have a thorough knowledge of the work he is about to do in any given case and if he is not in that mental state he had better let some one who is do the work. More deaths are due to faulty technic than to the application of wrong principles. If we wish to achieve ideal results we must work under ideal conditions; we must observe absolute asepsis and have unusual mechanical and operative skill and not pull, maul, tear, or strangle the tissues with sutures or ligatures. A. J. Ochsner burned these principles into my mind so deeply they became indelibly fixed. "Gentleness and thoroughness should be our aim. One's knives should be unusually sharp, the entrance wound made large enough, where conditions permit, to give plenty of room to make a complete dissection, hemostasis should be accurate. This facilitates a saving of time and every moment should bring certain results, work rapidly but not against time." When the operation is of an abdominal nature, while the surgeon is doing what one seems called to do, as per the diagnosis made, he should explore the other viscera, it takes but a moment and you will not be embarrassed by taking out an appendix and three days later find that you should have cared for a volvulus and that the patient would have lived had the proper attention been given him at the proper time. A complete operation should always be aimed at when conditions permit. Useless operations should never be done, that is to say no operation should be done unless one is confident that he can obtain a certain amount of fixed results.

In the diagnosis and treatment of a surgical disease the patient who can afford it has the advantage of several experts in several specialties. The family physician once represented all of the skill, both medical and surgical. To-day the surgeon represents all of the surgical skill, but the surgeon is dependent upon other specialists having to do with surgery.

The radiographist, the gastro-enterologist, the urologist, the bacteriologist, and all of the specialists, at times perform services which the surgeon cannot perform, and such services are now a part of his armamentarium. Besides these there are the nurse, the historian, and the anesthetist—other important adjuncts. Moreover, while the dividing line between surgical and medical diseases is being more clearly defined, the dividing line between surgical and medical patients scarcely longer exists. As a near approach to perfection in the treatment of surgical diseases is attained, more and more attention is given to the whole patient, who is now regarded as a community of organs with various disorders and possibilities of disorders, all more or less intimately correlated to the surgical disease. The best results in surgical work are attained where these facts are reckoned with. There is no question about more education on the part of the laity being required. The profession has reached a point now where it must go on. It will travel on its own momentum. The trend of thought to more perfect technic and greater achievement of more perfect results is constantly being beckoned on by the silent voice of science.

It should not be forgotten that kidney stones occasionally cause only vague, more or less continuous pain in the epigastrium or elsewhere than the loin. The finding of erythrocytes in the centrifugalized urine will give the clue.

EXPERIENCES WITH HYOSCINE-MORPHINE ANALGESIA OR NARCO-ANESTHESIA.

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For twelve years I have performed a goodly portion of my major operations under morphine-hyoscine analgesia—which generally acts as an anesthetic also. It is particularly applicable to those who for various reasons should not, or fear to, take chloroform or ether, also those who are unable to pay an anesthetist's fee. Neither shock nor nausea follow its use, this affording much satisfaction to both patient and surgeon. I employ the combination of hyoscine, morphine and cactoid. Morphine hydrobromide ¼ gr., hyoscine- hydrobromide 1/100 gr., cactoid 1/64 gr., is given hypodermatically in any part of the body 40 minutes before the probable time for beginning to operate. Some patients are ready for the knife in 20 to 30 minutes, others require half of the above dose repeated 40 minutes after the first injection. Susceptibility to this varies as much as in the use of chloroform or ether. Half or two-thirds of the original dose followed by a smaller dose in 30 minutes if necessary is advisable in small or depleted patients.

I have performed resections and amputations with the patient sitting up and conversing during the entire operation, sensing no pain whatever, Where delay is objectionable and analgesia is not quite complete, a few inhalations of chloroform put the patient under at once.

Some years ago I amputated a leg under this plan with no one present from beginning to end but the trusting patient. Though it was at the expense of great nerve strain we were rewarded by a painless, shockless recovery, primary union obtaining.

A mammary carcinoma, in an old lady who had been told to never take ether or chloroform again, was recently removed in the presence of surgeons and nurses who had not witnessed the use of narco-anesthesia before. All expressed themselves as favorably impressed. As to its use in obstetrical practice, the tendency to stop the pains discouraged me years ago, but it was probably due to having given too much or premature. I intend to give it a careful trial in these cases in the near future.

In a case of traumatic epilepsy exhibiting the most complete and prolonged opisthotonos unaffected by large hypodermatics of morphine of the administration of chloroform, this combination invariably relaxed the muscles in a short time and produced a restful sleep. I eventually trephined the case under its use.

During a seven year service as surgeon to a county hospital it was found to be the most satisfactory hypnotic for incurables with painful afflictions. A cystitis in a paralytic from fracture of a vertebra distinctly marked its efficacy. When judiciously used this compound is practically harmless and is applicable to a much wider field than has hitherto been awarded it.

Blastomycosis.

Blastomycosis should be ruled out in all cases of chronic pustular or ulcerative lesions of the skin, wasting pulmonary diseases in which there is a persistent absence of the tubercle bacillus in the sputum, in all superficial or deep abscesses, especially when connected with bones, suppurative arthritis and suspected Pott's disease. In the clinical study of blastomycosis it should be remembered that systemic infection usually takes place through the respiratory tract, and that the cutaneous manifestations are followed by systemic invasion with comparative rarity. It should also be remembered that the blastomycetic infections are essentially of a pyogenic character and that the pus wherever found is likely to contain the characteristic organism. In the skin, the encircling wreath of minute miliary abscesses or pustules on the periphery of the ulcers and granulomatous, fungoid, or papillomatous, areas is most characteristic. Abscesses in the subcutaneous tissues, lymphnodes, muscles, bones, nervous tissues and viscera are characteristic of this pyogenic tendency.—Rudolph Matas in *New Orleans Medical and Surgical Journal.*

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, JANUARY, 1916.

SURGICAL CONSIDERATIONS OF THE ALLEN TREATMENT OF DIABETES.

No serious problem more commonly confronts the surgeon than that of diabetes—either the diabetes that is merely incidental or, more especially, the diabetes that is contributory to the affection requiring operation. And so the surgeon, scarcely less than the internist, is deeply interested in a treatment which experiences thus far stamp as the most important contribution to the therapy of diabetes in many years. This, the so-called "starvation treatment of diabetes," devised by Frederick M. Allen of the Rockefeller Institute, appears to give much better results and more lasting results, so far, at any rate as sugar tolerance is concerned, than any other routine method. The surgeon well may hope, therefore, that, directly or indirectly, the Allen method will afford a solution to the serious problems of surgery in diabetics.

With the experimental basis and clinical rationale of Allen's treatment, with the details of the treatment itself, we presume most of our readers are familiar, for this has been one of the most important medical developments of the year just past. Those who are not yet familiar with the subject should read the articles by Allen himself and by Elliott P. Joslin, of Boston, in *The American Journal of the Medical Sciences*, October, 1915, and such current articles on the subject as that by Arthur Bookman in the *New York Medical Journal*, December 18, 1915. As a precise guide in the proper conduct of the after-treatment we commend, too, the brochure by Lewis Webb Hill, M. D., and Rena S. Eckman,* which contains a series of graduated diets carefully worked out at the Massachusetts General Hospital.

It seems reasonable to believe that a diabetic who has to undergo an operation of election, e. g. a hernioplasty, will be better prepared for that operation if rendered and held sugar-free by a deliberately conducted Allen treatment. But what of the diabetic upon whom operation cannot long be postponed? If the operation be imperative, but can be held off one or two or three days, will the patient be better prepared for it if starved that few days and thereby made sugar-free? If, after operation, glycosuria persists or returns, will the surgical patient tolerate starvation and subsequent carbohydrate deprivation as well as Allen has showed that un-operated patients do? What, if any, allowance is to be made for anesthesia and operation in conducting this treatment? In urgent and in fairly urgent surgical conditions in diabetics what can be done by this plan of treatment to increase the patient's safety?

Is it desirable to apply the treatment at all or in what modified form when operation cannot long be postponed? How is it to be applied after operation, after narcosis by ether, by chloroform by nitrous oxid?

These, roughly, are the surgical aspects of a problem well-worth studying, preferably with the help of an internist already familiar with the conduct of the "starvation treatment." No doubt various surgeons are putting these questions to a solution. We have, however, seen no publication thus far on the application of Allen's method to surgical cases. We await its appearance with very great interest.—W. M. B.

DIAGNOSIS OF PANCREATITIC DISEASE.

The pancreas, the least accessible to the surgeon of the abdominal organs, is also the least familiar to him in its morbid manifestations. Indeed, disease of the pancreas is often unrecognized as such until revealed at operation. To be sure, we are sometimes able to diagnose certain foudroyant types of pancreatic disorganization, and certain chronic pancreatic affections, but most often pancreatitis with acute symptoms is mistaken for some other affection of the upper abdomen, or such disease of the bowel as obstruction or mesenteric thrombosis.

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* The Starvation Treatment of Diabetes. Published by W. M. Leonard, Boston, 1915.

It seems more and more likely, as our experience has developed, that many attacks of upper abdominal pain and vomiting, attributed to ulcer of the stomach or cholecystitis are, rather, instances of pancreatitis. As Deaver has well put it, "Though the term acute pancreatitis is usually reserved for those pronounced and usually fulminating cases characterized by hemorrhage into the pancreas and surrounding tissues, with fat necrosis and servere local and systemic symptoms, it is a mistake to believe that acute pancreatitis can not occur without these severe manifestations. I am convinced that many such cases occur, and are regarded as instances of gall-bladder, gastric or duodenal disease, owing to the absence of distinguishing signs and symptoms and the reluctance of the physician to make an unaccustomed diagnosis. Such cases are encountered not so infrequently upon the operating table, where they may or may not be recognized according to the thoroughness of exploration of the surgeon and the degree of his interest in the pancreatic condition." (*Pennsylvania Medical Journal*, December, 1915.)

The study of the pancreatic (and biliary) ferments, readily secured from the bowel by means of the duodenal tube, will help a vast amount in the diagnosis of many cases; and if both surgeons and internists will encourage as a routine this study of the duodenal contents in diseases of the upper abdomen, there will be a yield of information that will go a long way, indeed, towards bringing the pancreas into the territory of diagnostic conquests. —W. M. B.

THE IMPENDING RUPTURE OF A PUS TUBE.

Accumulating experience has shown that rupture of a pyosalpinx into the free peritoneal cavity is not as rare an accident as it was once thought to be. Four years ago we found* ninety cases recorded in the literature, and have since then operated upon three in a general surgical service. Many other general surgeons have no doubt had similar experiences. That the lesion is not more familiar to the gynecologists is attributable to the fact that the diagnosis is usually not made before operation.

The signs and symptoms are those of peritonitis due to the rupture of a hollow viscus, and the appendix is most apt to be blamed. Since the indication for immediate operation is clear the previous determination of the offending organ is not of great importance. The diagnosis offers fewer difficulties, however, if the occasional rupture of a pus tube is borne in mind. In the presence of a diffuse peritonitis following an attack of severe pain, the Fallopian tube should be considered after the appendix, the gall-bladder, the bowel and the stomach. Localization of the pain and tenderness low down in the iliac region, *perhaps* the presence of an ovarian Head zone, the history of gonorrhea, of recent pregnancy or of uterine instrumentation, are all suspicious of tubal disease, which suspicions are fortified if there is great tenderness and a mass or fulness in the vaginal fornix, especially if it be on the left side, where an appendix abscess is not likely to be found. If the patient is known to have had a pyosalpinx, especially if it has been giving such evidences of activity as repeated attacks of pain, the diagnosis of ruptured pus-tube is presumptive Finally, if a previously palpated tense tube is now felt flaccid or collapsed, the diagnosis may be made with assurance.

What is more important, however, than the differentiation between ruptured tube and ruptured appendix is the determination, in cases of pyosalpinx under observation, of *impending rupture*. This, too, can sometimes be done. It is to be noted in the histories of several of these cases that there were repeated attacks of severe pain, usually localized, over a period of several days before the final attack that marked the rupture. Just as these preliminary seizures are suggestive of a tubal rupture in a case of purulent peritonitis, so in a known case of pyosalpinx are they sufficiently significant, we believe, of impending rupture to warrant the abandonment of conservative treatment in favor of salpingectomy or vaginal drainage.—W. M. B.

Surgical Suggestions

In differentiating between appendicitis and stone in the right ureter, hematuria is not a deciding factor. It occurs not rarely in appendicitis.

Arches will not cure all the pains that feet are heir to. Yet there are few people with pain in a foot or both feet who have not had arches prescribed for them.

In seeking the cause of an inguinal adenitis do not overlook the anus and prostate.

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* Rupture of pyosalpinx as a cause of acute diffuse purulent peritonitis, *Surgery, Gynecology and Obstetrics*, May, 1912.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

NATURE OR SURGEON?

While the war in Europe is killing hundred-thousands of men and myriads are being incapacitated through wounds by bayonet, saber, bullet, shell and shrapnel, there has not been a tremendous moral revulsion against this liberation of the primitive instinct of killing. Normal men of maturity are being reduced in potential power so that their full social capacity may never again be available to their respective nations. The mental incapacities that are to result from the scenes of horror, the inspired fears and the tremendous exhaustions are beyond estimation at the present time. It required, however, a small child in Chicago to create a social, economic, and ethical discussion of major importance as to the right of a mental defective to live and the prerogative of a surgeon in determining upon the course of action he should pursue with reference to a congenitally maimed child.

Is a surgeon justified in deciding to withhold an operation which might prolong the life of an infant whose future would be essentially parasitic in nature? Is the ethical content of "Thou shalt not kill" sufficient to compel operations, which in themselves might lead to death, in the hope of prolonging life even for a short period of time?

This particular incident possesses unusual significance because it aroused a wave of emotionalism and sentimentality on the one hand, and an attempt at the crystallization of scientific, social, and ethical opinion on the other hand.

Life itself is not held sacred by the State, as is evidenced by the fact that the death penalty is still exacted as punishment for crime. Society has no hesitancy in extolling the virtues of those who destroy lives in military combat for the defense of the state. Society condones wilful destruction of man through the operation of the "unwritten law" in defiance of the enactments of the written law. Herein, it is patent that those standing for law and order do not consistently regard life as sacred under circumstances requiring self-defense, the defense of the family or nation, or the protection of society from male-factors. It is true, there has been much progress since the bloody laws of Draco which indicated a constructive disregard for the individual's right to live. Among the Greeks where the service to the State was of paramount importance, the exposure of children on Mount Hymettus was not dissonant with the ideas of Spartan morality. Under the sway of Roman law the power of the father (patri potestas) over the life and death of his children was generally recognized. In the modern conception of the State's power, children are considered as wards of the State and under the protection thereof. There has been inaugurated a remarkable code of laws for the protection of infantile life, the best exemplification of which is the British Children's Charter.

Is the State justified in considering all children in the light of their possible advantage to itself through their future service? If so, is it justified in determining upon a policy that will legally permit children, mentally defective, to have their days on earth limited through acts of man? Unfortunately, in the consideration of this question, there is too frequently confusion in the minds of some between unfortunate infirmities, unesthetic to view and limiting function in a physical way, and those incapacities which actually produce social uselessness. No one would advocate death for a child congenitally blind or congenitally deaf or congenitally disfigured as long as there was assurance of inherent mental educability to a plane of social usefulness. The idiot, however, represents a different type of child whose mental powers can never be developed so as to make it capable of self-adjustment or self-protection in its environment.

There are few types of defectives whose conditions may be recognized more or less readily at birth. Many cases of mongolism, microcephalus, hydrocephalus and cephalic monsters represent infants of this order. Their life history, in event of their living beyond the age of puberty, amounts to social parasitism.

Every surgeon in the discharge of his duty is bound to bring his best judgment to bear upon the proper course of action to pursue in any specific case. His judgment may decide for or against an operation. This decision is certainly one of his prerogatives and the freedom of his mind is one of the checks upon his actions which is protective of the community. When, however, his decision contravenes tradition and his judgment and conscience dictate an action of vital importance to the patient, his family, and the community, his action should not be based merely upon his own initiative and unsupported opinion, but should have the supporting strength of the opinion of consultants. Then only should the family be given the choice as to whether an operation is to be performed or not. In the last analysis the family still has the right to decide which opinion it will adopt with regard to an impending operation. If the family for sentimental reasons chooses to preserve a life against the judgment of the attending surgeon, the latter is privileged to ask permission to be relieved from further responsibilities or connection with the case.

By some the term "murder" has been carelessly used with reference to the neglect of the Chicago surgeon to perform an operation which might or might not prolong life. The term is unfortunately and incorrectly applied. "Murder—to kill a human being with premediated malice; take the life of deliberately, maliciously, and unlawfully, or criminally." "Murder is the intentional killing of one human being by another either without moral right or without legal authority." In its legal significance it is also defined as "the killing of a human being either directly or indirectly without excuse or justification and by any means other than perjured or false evidence before the tribunal of justice."

The question of the interpretation of these definitions merely resolves itself into this: Is a surgeon justified in permitting nature to take its course? Is he morally and ethically justified in refusing to perform an operation which he believes will not cure the pathological condition nor indeed palliate it? It is needless to say that, daily, many decisions of this character are made throughout the country without the suspicion of malice, moral indefensibility or implied criminality. To be sure, there are many vital questions which might grow out of careful consideration of this opinion. To illustrate, would a surgeon be justified in refusing to operate, for a gangrenous appendicitis, upon a feeble-minded adult, living in an institution supported by the state? This, however, is but one of many types of decisions about which there might be considerable difference of opinion at the present state of thought.

The importance of the Chicago case is enhanced by some of the dangers inherent, even in collective judgment as to the probable mentality of children. Feeble-mindedness is rarely noticeable until after the first few years of life. The dangerous, moral defectives are certainly not recognized until well along in childhood. The physical stigmata of children are not to be relied upon as necessarily indicating a tendency to mental degeneration. Even head measurements are not constantly reliable. It is undoubtedly true that the presence or absence of deformities of the ears, palate, eyelids, etc., tend to be more common and more extensive in the worst types of mental defectives, but this may be said to be only a tendency.

Fortunately, mental defectives die at earlier ages than normal children and have diminished resistance to disease. Dr. Shuttleworth found the mortality of mental defectives to be nine times as great as that of normal children.

With the rapid breeding qualities of defectives, if our eugenically-minded colleagues are correct, we should by this time be overwhelmingly inferior mentally and physically. As a matter of fact, however, it is probable that the high mortality rate during infancy, particularly during the first week and the first month, takes its greatest toll from among those infants whose social usefulness would be limited because of genetous defects. The recognition of this tremendous infantile mortality is desirable in order to intelligently judge whether letting nature take its course in the interests of the child, the family, and the state, is morally justified. Would surgery tend to decrease in any way the infant mortality among weakened and mentally limited infants? While presenting these figures, it must not be forgotten that the most difficult problem is recognized in the difficulties and limitations of determining mental infirmities at birth.

During 1911, there died 149,322 children under one year of age within the registration area. Of this number some of the causes of death were syphilis 1,787, convulsions 3,643, malformations 7,879, premature birth 23,539, congenital debility 18,580 and injuries at birth 4,573. These six causes alone were responsible for more than one-third of the total mortality of the first year. It is not improbable that this figure includes a considerable number of the infants whose physical appearance might suggest mental incapacity and for whom the question of operation would have to be considered.

During the first week, however, one quarter of the total annual deaths occurred from: syphilis 25[illegible], convulsions 1,076, malformations 4,586, premature births 18,606, congenital debility 6,531, injuries at birth 4,101, the total from these six causes being 39,216. These figures change within the first month so that approximately one-third of the total first year mortality and almost five-sixth of the total mortality from these six conditions are noted within the first month of birth: syphilis 696, convulsions 1,928, malformations 6,171, premature births 22,477, congenital debility 10,368, injuries at birth 4,530, making a total of 46,170.

In the light of the well recognized tremendous, preventable, infant mortality rate, in the light of the inadequate obstetrical and nursing care, and in the face of nature taking its course in thousands of instances, where mere hygiene, education, or living wages could prevent it, has there not been too great a storm of emotionalism over the death of the unfortunate and fortunate, mental weakling and physically deformed infant of Chicago? The main question is not so much, should this particular child have been permitted to die without an operation that could not have cured it, but is there any social or moral reason justifying society in permitting mentally normal children to die from preventable causes at which society feels no moral revulsion?

Book Reviews

Manual of Surgery. By ALEXIS THOMSON, F.R.C.S. ED., Professor of Surgery, University of Edinburgh; Surgeon, Edinburgh Royal Infirmary and ALEXANDER MILES, F.R.C.S., ED., Surgeon Edinburgh Infirmary. *Fifth Edition, Revised and Enlarged.* In two volumes. *Volume One.* Octavo: 801 pages; 289 illustrations—General Surgery. *Volume Two.* Octavo: 948 pages: 301 illustrations—Regional Surgery. Edinburgh, Glasgow, and London: HENRY FROWDE AND HODDER AND STOUGHTON, 1915.

The new revision of these two volumes attempts to present a practical and timely text of surgery. A third volume will deal with operative surgery exclusively and the present volumes, therefore, are free from all descriptions of operative procedures.

Volume I.—General Surgery. The authors briefly describe the process of repair and the conditions which interfere with repair. Inflammation and suppuration are discussed from a surgical standpoint and tersely. The chapters on surgical bacteriology are very brief, but written with care and accuracy. The chronic infections, then the acute infections, and finally neoplasms are dealt with. In the discussion of shock, to instance one chapter where the content is brought up to date, we have mention of Gray and Parson's theory of abnormal afferent impulses, the theory of vasomotor exhaustion, advanced by Crile and Mummery, Malcolm's theory of the contraction of the arterioles, finally Yandell Henderson's explanation of the diminution of the carbon dioxide content of the blood. The chapters on dislocations and fractures offer nothing new, but are rather well illustrated and afford a concise manual of these surgical conditions.

Volume II.—Regional Surgery. Each region discussed is prefaced by a simple yet adequate presentation of its surgical anatomy. Obviously one moderate sized volume cannot present comprehensively so vast a subject matter as regional surgery. For this reason some chapters are quite meager in subject matter, for instance the chapter on the thyroid gland, where the classification of thyroid diseases is not well given, or the chapter on the ear, in which the ear conditions are practically just enumerated. The text, however, on concussion and compression of the brain, of the various forms of hernia, of stomach, intestinal and gall-bladder surgery, as well as the genito-urinary surgery are properly detailed.

Emergency Surgery. John W. Sluss, A.M., M.D., Associate Professor of Surgery, Indiana University School of Medicine; Ex-superintendent, Indianapolis City Hospital; Surgeon to the City Hospital. *Third Edition, Revised and Enlarged.* Duodecimo; 828 pages; 685 illustrations, some colored. Philadelphia: P. Blakiston's Sons & Co., 1915. Price, $4.00, net.

This book aims to be a concise volume for the general practitioner in the surgical phase of his daily routine. The conditions, therefore, are considered chiefly from a practical and emergency point of view. The book endeavors to do what Lejar's larger work did, but in a more condensed and brief way; in fact Lejar's is not infrequently quoted in Sluss' text and a number of Lejar's illustrations are used. In the light of the increasing knowledge of military surgery, Sluss lays some emphasis upon the chapter dealing with this branch of surgery. The book abounds in numerous small practical and valuable suggestions; for instance, in the removal of small tumors, in skin grafting, in finger amputations, in tendon sheath phlegmons. The illustrations are clear and satisfactory.

Handbuch der Kinderheilkunde, for the Practitioner. Edited by Professor Dr. M. Pfaundler and Professor Dr. A. Schlossmann. Volume five—The Surgery and Orthopedics of Childhood. Large octavo; 418 pages; 25 colored plates and 258 illustrations. Leipzig: F. C. W. Vogel, 1915. Price, 20 marks (unbound).

Except for two comparatively small portions, dealing with orthopedic conditions of the child, and written by Fritz Lange of Munich, this volume was written by Hans Spitze of Vienna.

Part I. deals with congenital diseases. This text is profusely and beautifully illustrated. Each condition is discussed etiologically, pathologically, the symptoms and signs clearly presented, and the various forms of treatment indicated. The parts here, dealing with the lip and palate defects and the genito-urinary defects, deserve particular mention. The discussion of congenital hernia is very good, and the accompanying illustrations and diagrams leave little to be desired.

Part II. treats of the surgical disturbances mainly skeletal in nature, which appear after birth.

Part III. takes up surgical infections, acute or pyemic and chronic or tubercular.

Part IV., Part V., Part VI. deal respectively with traumata, neurological conditions, and tumors.

Throughout the book there are numerous illustrations and finely executed colored plates. The text is clearly and well printed.

Books Received

Potter's Compend of Human Anatomy. Revised by D. Gregg Metheny, M.D., L.R.C.P. and S. (Edin.), L.F.P.S. (Glasgow); Associate in Anatomy, Jefferson Medical College, Philadelphia. *Eighth edition.* Duodecimo; 428 pages; 139 illustrations. Philadelphia: P. Blakiston's Son & Co., 1915.

An Introduction to Bacteriology for Nurses. By Harry W. Carey, A.B., M.D., Former Assistant Bacteriologist, Bender Hygienic Laboratory, Albany, etc. Duodecimo; 151 pages; illustrated. Philadelphia: F. A. Davis Company, 1915; Price, $1.00, net.

The Obstetrical Quiz for Nurses; A monograph on Obstetrics for the Graduate and the Under-Graduate Nurse in the Lying-in-room. By Hilda Elizabeth Carlson. Duodecimo; 322 pages. New York: Rebman Company, 1915.

Theory and Practice of Bloodletting. By Heinrich Stern, M.D., LL.D., Visiting Physician St. Mark's Hospital, Consulting Physician Methodist Episcopal Hospital, Founder and Editor of the *Archives of Diagnosis,* etc. Duodecimo; 371 pages; 23 illustrations. New York: Rebman Company, 1915.

Hospitals and the Law. By Edwin Valentine Mitchell, LL.B., of the Faculty of the College of Law of the University of South Dakota. Duodecimo; 191 pages. New York: Rebman Company, 1915.

Laboratory Methods, With Special Reference to the Needs of the General Practitioner. By B. G. R. Williams, M. D., Member of Illinois Medical Society, American Medical Association, etc. and E. G. C. Williams, M. D., formerly Pathologist of Northern Michigan Hospital for the Insane. *Third Edition.* Octavo; 214 pages; 43 illustrations. St. Louis: C. V. Mosby Company, 1915, $2.50.

Diseases of the Skin. By Henry H. Hazen, M. D., Professor of Dermatology in the Medical Department of Georgetown University, Professor of Dermatology in the Medical Department of Howard University; Sometime Assistant in Dermatology in the Johns Hopkins University, etc. Octavo; 539 pages; 233 illustrations. St. Louis: C. V. Mosby Company, 1915.

"Speaking of Operations." By Irvin S. Cobb. Duodecimo; 64 pages; illustrated. New York: George H. Doran Company, 1915. 50 cents.

Progress in Surgery

A Résumé of Recent Literature.

Chronic Retention of Urine in Children. Edwin Beer, New York. *Journal of the American Medical Association,* November 13, 1915.

A number of cases of urinary retention in children are reported by Beer. Invariably the condition had in all cases been unrecognized before and the children were steadily deteriorating in health. The following is Beer's description of the condition as seen by him: "The picture presented by these cases is very suggestive of chronic interstitial nephritis. The patients become pale and pasty. Frequently they are apathetic. Usually there is some difficulty in urination. The little patients complain of pain, or their parents note that they take a long time to complete the act. In some cases the straining is so great that the patient shows collapse symptoms with excessive pallor and weakness. On physical examination a globular mass is felt in the hypogastrium; it varies in size, but never disappears spontaneously. If infection is present, the mass may be tender. When a catheter is passed, this tumor vanishes. There is regularly residual urine. The walls of the bladder are hypertrophied, though this may not be evident late in the disease when excessive dilatation takes place. On palpation one may feel the bladder contract and become hard, behaving like the pregnant uterus. If no infection has set in, the urine may be clear, suggesting the urine in chronic interstitial nephritis. Eventually all the patients seem to become infected. As a secondary and constant development, the ureter openings become patulous and the ureters dilated. Unilateral or bilateral hydronephroses develop, and the enlarged kidneys partake of the trouble, and infected hydronephrosis with or without multiple abscesses develops." Neurologic examination sometimes shows nothing abnormal, but in other cases distinct evidence of cord or brain lesion is found, the symptoms being much the same in both. Strictures in the prepuce or urethra sometimes exist and should be regularly looked for. The etiologic factors are tabulated: first, mechanical obstructions, extravesical or intravesical, and, second, neuromuscular, such as brain or spinal cord disease and spasmodic sphincter. The cases due to extravesical obstructions are well known and two are reported. The neuromuscular group of cases with definitely discovered lesions such as Little's disease, myelitis, etc., are also represented in Beer's reported cases, and brief abstracts of cases reported by other authors are inserted. The question of a unilateral renal involvement is also considered and one case in which it is suspected but not definitely proven is quoted from Bachrach. The treatment of the cases due to mechanical obstruction, intrinsic and extrinsic, is most hopeful. If the strictures cannot be reached through the bladder or through the perineum, which is rarely the case, a temporizing cystostomy will be in place. Therapy is pretty well baffled, however, in the second group. Medicinal treatment with iodids and possibly mercury and antispasmoics will have to be tried, together with dilatation of the sphincter, and, if all attempts fail, cystostomy, perineal or suprapubic, with section of the bladder neck will be indicated. To save the progressive changes in the kidneys and ureters, if a kidney becomes infected, nephrotomy rather than nephrectomy is indicated when feasible in view of the symmetrical development of the disease.

Raynaud's Disease. Report of a Case of Symmetrical Gangrene of Unusual Severity.

A. L. Hoyne, Chicago. *Journal of the American Medical Association*, November 13, 1915.

Hoyne prefers a stricter conception of the condition than is sometimes held. This would exclude the local syncopes of "dead fingers" and also the local asphyxia in which the parts become cyanotic and include only the symmetrical gangrenes, or the third stage of Raynaud. With this conception of the disease it is much rarer than is sometimes held in the literature. In looking over the clinical records of Cook County Hospital, which treats about 30,000 patients annually, as far back as they are available, he has found but three cases with a diagnosis of Raynaud's disease. This shows how rare the condition really must be. All three of the cases were adult males. All were associated with pain and in two of them swollen joints were a symptom. In the third case clinically diagnosed, the patient was in the hospital only forty minutes and refused a physical examination. Very little is known of the etiology. Heredity and nationality seem to play a part; of the cases reviewed by Hoyne 50 per cent. were Russians and the patient in the case he reports was of Polish birth. The disease may occur at any age, and according to his own findings, it is seen about equally in both sexes, or the males slightly predominate. Of the symptoms, pain and absence of fever at the onset are characteristics. Tips of fingers and toes are most commonly affected, more rarely the ears and tip of nose. Contrary to most authors' assertions, the lower extremities were involved in the majority. Hyperesthesia to touch is common and in the first stage or local syncope there is no pitting on pressure. Loss of sensation in the part affected usually follows gangrene. A line of demarcation is usually well developed early and the part involved assumes a black leather-like appearance. The pathology is still somewhat obscure. Raynaud credited the condition to central nervous derangement involving the arterioles. Weiss, however, considers it more due to the veins. Lustgarten seems to credit a luetic origin. That the central nervous system is partly at fault seems evident. A long list of conditions to be differentiated, ranging from frostbites to leprosy and angioneurotic edema, are given, but Hoyne thinks all of them can be easily excluded. The disease usually exists for a number of years. Acute fatal cases are rare. For the treatment almost everything has been tried and symptomatic treatment is all that can be advised. The parts should be kept warm and dry and when gangrene develops the case must be considered from a surgical point of view. The patient in the case reported was a boy 5 years old and the case was followed up to necropsy. There were acute symmetrical dry gangrene of all the extremities and the cheeks, a probably secondary thrombosis of the right femoral vein, general lymphadenoid hyperplasia, infiltration of the liver and kidney degeneration and a bilateral confluent pneumonia, which was the apparent immediate cause of death. The histologic examination gave no definite findings. A bacteriologic examination by Dr George Mather isolated a green streptococcus and a hemolytic streptococcus which caused a malignant endocarditis in rabbits.

Late Results of Excision of the Transverse Process of the Fifth Lumbar Vertebra.

F. J. Fassett, Seattle. *Journal of the American Medical Association*, Nov 20, 1915.

Three cases of neuralgic trouble due to anomalies or injuries of the fifth lumbar vertebra and relieved by operation of excision of the transverse process are reported by Fassett. Other remedies had failed and the operation was done as a last resort. The danger in the operation seems to lie in injury to the great nerve trunks, and the anterior tibial nerve fibers appear to be especially exposed. In one of the cases relief followed removal of the process on the same side as the pain and in another on the opposite side, which speaks against simple pressure being the cause. Fassett thinks the theory that the process furnishes a point about which an extreme leverage is brought into play quite plausible. Four methods of approach to the joint have been suggested: the simple incision through the erector spinae muscles, the osteopathic reflection of a portion of the crest of the ilium, the ventral route, and the muscle-flap method used in these cases. The cases show that the processes can be removed without serious damage by the first method and the last.

The Significance of the Fixation of Certain Abdominal Organs in the Human Body.

R. C. Coffey, Portland. *Journal of the American Medical Association*, November 20, 1915.

The differences in the visceral arrangements between man and animal as regards the proper location and fixture of the viscera and the consequences when this is not normal in man are described by Coffey. In man the capsule of the liver is fused with the diaphragm, while in the quadruped it is suspended by a mesentery like other organs. In man the duodenum is firmly fixed to the right abdominal wall, while in the quadruped it is freely movable. In man the great omentum goes down over the transverse colon and adheres to it and the omental bursa is usually obliterated by adhesion of its layers together. Neither of these occur in the quadruped. The pancreas in man has been rotated behind the peritoneum and fixed to the abdominal wall, while in quadrupeds it lies between the layers of the mesentery. The methods in which these adhesions take place normally during fetal life are described, but unfortunately they do not always take place in the human species. It is rare that the duodenum and pancreas fail to adhere and the omental bursa only occasionally fails to completely obliterate, but all these changes and others produce uncomfortable symptoms of visceral ptoses and displacements, such as floating kidney, etc. The remedies for these defects are discussed. In cases of defective fixation on both sides resulting in ptosis with the characteristic body formation, surgery is usually not indicated and forced feeding Coffey says by increasing the abdominal pressure, will produce the best results. Occasionally in severe cases the fixation of the ascending and descending colon and the two kidneys are needed for permanent relief. The hammock operation which is briefly described is rarely necessary, but a right-sided ptosis alone calls for more frequent surgical interference which consists, first, in making a posterior incision as in nephrectomy, opening the peritoneum, removing the appendix and suturing the colon to the parietal peritoneum, and afterward fixing the kidney to the quadratus lumborum. In some cases of severe intestinal stasis, when the hepatic flexure may or may not be removable the patient may be relieved by suturing the cecum and ascending colon into its normal position and continuing the line of suture at right angles forward across the lateral wall to the front abdominal wall, and in order to keep the transverse colon from dragging on the angle suturing the omentum to the parietal peritoneum from the mid-line over to meet the line of suture coming from the newly made hepatic flexure. This, the most frequent operation indicated in dealing with all defects of peritoneal fusion, is described in detail. Occasionally a severe case of constipation is due to the lack of obliteration of the omental bursa and which cannot be cured by other means is entirely cured after suturing the omentum to the abdominal wall, obliterating the bursa and holding up the middle of the transverse colon, thus preventing the dragging of a loaded transverse colon on the flexures.

Anteversion of the Neck of the Femur in Connection with Congenital Dislocation of the Hip. R. A. Hibbs *Journal of the American Medical Association,* November 20, 1915.

Hibbs says the frequency of anteversion of the hipjoint has not been appreciated, nor has its influence on the final result in the treatment of the congenital dislocation of the hip. The effects of the acetabulum have been more considered and without doubt it is at fault in some degree, perhaps in all cases, and in some so much so as to prevent cure, but the anteversion, he thinks, is more often the cause of failure to secure ideal results. More than from 10 to 15 degrees of anteversion are abnormal. The head of the femur cannot be completely in the socket, and weight bearing and walking are affected. The question why the deformity takes place is important. It seems probable that it is due to a twist in the shaft of the femur, and it would seem logical to treat it as such and correct it by osteotomy before attempting reduction. This was done in twenty-nine hips in twenty-six patients at the Orthopedic Hospital, all the earlier patients having been previously treated for dislocation once, and in some cases twice. After the bone is divided, the lower fragment is twisted outward to the degree that the head is abnormally anteverted. After the bone unites the patient is allowed to walk in from eight to ten weeks until the external rotation of the leg is corrected by exercises and it takes the normal position in walking, the patella and toe pointing forward. At this point in the treatment the dislocation should be reduced. The lower third of the bone is selected for the operation, first, because here it does not interfere with muscle attachment, and second, because both fragments are long enough to give perfect control.

A Plea for Cholecystectomy. John W. Lane, Boston. *Journal of the American Medical Association,* November 20, 1915.

Lane pleads for cholecystectomy as the ideal operation in gallbladder disease. The function of this organ is not yet fully known, but it is not an essential to life. Mayo has suggested that it is a useless organ left over from a stage of human embryology. There are certain conditions, however, in which cholecystectomy is strongly contraindicated, such as acute and chronic pancreatitis of an advanced type and where there is an unsurmountable obstruction of the common duct. The claim that cholecystotomy is safer is denied by Lane from his experience. He has never yet been able to find a trocar that did not leak around its puncture site, and it is not possible to do a cholecystotomy without soiling the field to a greater or less extent. The statement that cholecystotomy is rarely followed by true reformation of gallstones is probably true, but recurrence of symptoms is not rare. The objection to cholecystectomy that conditions may arise when the need of drainage is urgent but impossible on account of the removal of the gallbladder is considered negligible by Lane. The advantages of cholecystectomy are primarily that it removes from the body the natural habitat of gallstones, the quickness of convalescence, the freedom from the need of drainage and the quick healing, lessening the stay of the patient in the hospital. The higher mortality of cholecystectomy claimed by some is due not to the operation but to its delay, as is also the mortality from appendicitis, and the public should be educated in regard to this as it has been in regard to the last named disease. Lane has performed seventy-seven cholecystectomies, with but two deaths, one of these due to bad judgment and not to the operation, and the other to the lack of proper previous medical examination. In two of his cases and in addition to the cholecystectomy, both an appendectomy and a gastro-enterostomy, were performed at the same time.

The Citrate Method of Blood Transfusion in Children. R. Lewisohn, New York. *American Journal of Medical Sciences,* December, 1915.

Lewisohn recommends his method of transfusion as particularly applicable in children, in whom the older anastomotic methods are notoriously difficult. The technique is the same as that for adults. The donor's vein can be punctured proximally or distally, the direction to be chosen according to the individual case, whichever way the blood runs with the greatest facility into the glass receptacle. The blood is mixed in the glass jar with a 2 per cent. sterile solution of sodium citrate at the ratio of 1 to 10 (*i. e.,* 10 parts of solution to 100 c.c. of blood). For the reintroduction of the blood a very fine needle or cannula can be chosen. Thus one can inject the blood even in small children through a superficial arm vein of the finest caliber. This obviates any extensive dissection. By using so fine a needle one assures the slow injection of the blood and prevents the danger of sudden overloading of the circulatory system. The salvarsan flask is attached to a stand and the blood allowed to run into the vein drop by drop (in 1 case the injection of 350 c.c. thus took nearly an hour, and the three-year-old child stood this rather large quantity of blood very well, just on account of the slow injection). Lewisohn reports seven cases of transfusion in children, all of whom received profound benefit; in some the transfusion appeared life-saving.

Some New Surgical Experiences. (*Einige Neuere Chirurgische Erfahrungen*). Emil Engel, Döbritz. *Deutsche Medizinische Wochenschrift,* November 4, 1915.

It has been customary to economize in the use of bandages, and now it appears that this economy, even stinting, brings with it a great deal of good, inasmuch as, generally speaking, the less bandage, and the less frequently applied, the better the result. Even pus wounds are best left alone for several days in succession; healing appears to take place better and sooner when the bandages are literally saturated with pus. A rise in temperature indicates the immediate need for fresh dressing. Many wounds will heal when approximated with plaster strips only. Suturing a prurulent wound will, not infrequently result in much union of the edges. Wound fistulae heal best when promptly laid open and thoroughly curetted. Stiffness of the elbow joint may readily be overcome by simply inducing the patient to carry a pail of water every day, more and more water being added to the pail gradually.

The management of surgical wounds in the field hospital shows that best results follow conservative treatment.

The Treatment of Septic Wounds in War by Magnesium Sulphate Solution. A. E. Morison, Sunderland, and W. J. Tulloch, Newcastle-on-Tyne. *The British Journal of Surgery,* October, 1915.

These authors had become so impressed with the use of saturated magnesium sulphate solution as a dressing application for accident wounds from shipyards and coalmines treated in civil hospitals, that they decided to apply the same treatment in the French and English war hospitals. 40 ounces of magnesium sulphate are dissolved in 10 ounces of glycerine and 30 ounces boiling water, and sterilized in the autoclave. For recent injuries, the wound is laid wide open, the wound surface swabbed with pure phenol and lightly packed with 5 per cent. carbolic gauze. The wound is then irrigated with magnesium sulphate solution, and loosely packed with gauze, soaked in the same solution. In wounds of later date, with sepsis established, the pure carbolic-acid is omitted, and the magnesium treatment started at once. Dressings need never be changed oftener than every twelve hours. The effect on the wound is striking.

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BLOOD PRESSURE IN GENERAL ANESTHESIA.*

E. I. McKESSON, M.D.,
TOLEDO, OHIO.

Since the anesthetist is the only person in the surgical team who is at liberty during an operation to make the necessary tests to determine the condition of the patient, he should avail himself of every practical means by which such information may be obtained. His prognosis, if based upon reliable data, will be a valuable guide to himself and the surgeon, who may vary his operation to meet existing conditions and thus save lives both on the table and afterwards.

Among those tests, blood pressure stands out as the most reliable indicator of changing cardio-vascular conditions during an operation, and will show the progress of such conditions as shock long before it may be detected by feeling and counting the pulse. The treatment of shock, once well advanced, has been notoriously inefficient, and if anything is to be done it must be recognized and the treatment instituted before the heart is exhausted by rapid contractions in its attempt to hold up the blood pressures.

During the past eight years I have charted more than five thousand cases, taking the blood pressures, pulse and respiration every few minutes during each operation, and while I must not be understood to belittle other methods of interpreting the patient's condition, I believe that the value of blood pressure during an operation has not been appreciated by the large majority of anesthetists and surgeons.

The blood pressures of any patient vary as a whole, in response to changing requirements of comparatively slight importance. These changes from the patient's normal reading, however, rarely exceed 10 per cent., while those pointing to unusual, or pathological significance may be very great. The interpretation, therefore, of a *group* of blood pressure readings of a patient is based more upon these abnormal variations, whether they be high or low, than upon any one reading. During an operation to take one reading as a sign of the patient's condition, would generally be misleading, but a group of readings will show the *tendency* towards shock in its various manifestations, the reaction of the patient to various procedures in the operation, and especially to the influence of the anesthetic.

Unvariable pressures during operations are the result of most painstaking technic on the part of the surgeon, anesthetist, and every one concerned in carrying out a shock-free technic. Such results cannot be obtained by accident, but it is necessary to eliminate certain procedures peculiar to the individual surgeon and anesthetist, which by means of blood pressure readings are found to be frequently productive of more or less disastrous results, either at the time, or during the few days succeeding the operation. For example, no surgeon is willing to admit that he is rough in the belly, and no anesthetist will admit that he generally overdoses his patients, but a series of cases where the blood pressures are frequently taken in each case, will commend or condemn their technic most emphatically. If circulatory depression frequently occurs even in minor degree, it is due to faulty technic and the cause should be discovered and removed; it may necessitate a new technic in several particulars.

For the sake of convenience, the cuff is *fastened* upon the arm by pinning the folds together with a safety pin, and the stethescope bell is also held in place over the artery by means of a three-quarter inch elastic web passing around the arm. The webbing is buckled just tight enough to hold the diaphragm in place. The stethescope is provided with about two feet of rubber tubing leading to the ear pieces so that the auscultatory method may be carried out by the anesthetist without disturbing sterile dressings, or in the least inconveniencing himself.

We shall not discuss the technic of taking blood pressure, which has been so frequently explained and is familiar to all. It is, however ,important to understand that the pulse pressure from the standpoint of the anesthetist, is quite as important as the diastolic pressure, which makes it necessary to take both systolic and diastolic readings at each determination. It is also important in our work that these readings for comparison be made in either expiration, or in inspiration since respiration exerts considerable influence on the blood pressure in many cases under general anesthesia. Personally, I make both determinations in expiration, but if the respiratory variation of blood pressure is unusual I also chart the readings in inspiration.

A few points in physiology must be understood, which are of special interest clinically in the interpretation of the condition of the patient by means of blood pressure tendencies.

The physiology of the circulation is applied physiology of muscle, and those influences which control or modify the action of muscle, influence the speed of the blood, the volume moved, and the pressure developed.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, June 21, 1915.

We find the greatest development of muscle, of course, in the heart; while in the great arteries, muscular tissue is displaced by passive elastic tissue. In the very small arterioles muscle again becomes relatively prominent in the wall. It is in this later region that the *control* of the flow of blood through any group of organs occurs; it is here that the principal dilitation or congestion of the arterial system takes place to accommodate the extra volume of blood, which is thrown into the arteries at each heart contraction; it is also in this region that the disturbance of balance between peripheral resistance, and the output of the heart is often initiated.

The state of tonus in the arteriole is, no doubt, the result of at least three kinds of stimulation: (1) the mechanical stimulation due to repeated sudden stretchings of the arteriolar muscle by the pulse wave; (2) chemical stimulation by carbon dioxid, adrenalin and other drugs; (3) nervous stimulation. For this reason, any influence which reduces the pulse impact, or pulse pressure, even though an increased pulse rate maintains an equivalent or greater output of blood, is a cause of arteriolar dilitation, or congestion which may be of such general distribution as to be the cause of shock. This is one of the results of pushing an anesthetic to deep relaxation, which reduces the pulse pressure in the same way and at the same time that the skeletal muscle is relaxed with only a difference in degree.

The normal relation of pulse pressure to diastolic pressure is expressed by the fraction ½; that is, in a normal patient whose systolic pressure is 120 and diastolic 80, which would make a pulse pressure of 40, the ratio of pulse pressure to diastolic is 40-80, or ½. The heart load, or pulse pressure, therefore, is normally 50 per cent. of the diastolic pressure. This ratio is maintained in spite of quite large variations in the actual readings exhibited by the patient with a normal vascular system. This ratio is of importance in prognosis, because the patient who presents a pulse pressure equal to or greater than the diastolic pressure will not tolerate low blood pressure, or shock, and will be unable to combat peripheral relaxation occurring in shock by increasing its output, since already the heart is overloaded and is using up its reserve force daily. A patient with slight *under*load, that is, where the pulse pressure is less than 50 per cent. of the diastolic, but more than 25 m.m. pressure, is usually a better risk for serious surgery than those with enormous overloads.

The diastolic pressure, in general, is a measure of *arteriolar* tonus, while the pulse pressure represents the strength of heart contractions; both are influenced by the heart rate and respiration rate.

The heart has two methods of varying its output of blood, namely, by changing its rate of contraction and by changing the amount of blood moved at a stroke. Clinically, it is generally observed that a rapid heart which has been preceded by a momentary fall in diastolic pressure, and which in spite of the rapid contractions, is unable to increase the total or systolic pressure, will exhibit a gradual decrease in pulse pressure, which is one of the cardinal signs of approaching shock.

To follow this typical case through to complete shock, the pulse pressure becomes progressively smaller and smaller, while the diastolic pressure also falls progressively, but often in such a ratio that the pulse pressure to diastolic pressure is less than one-half. When the pulse pressure has reached 20 m.m. or less, and is associated with a diastolic pressure of less than 80 in a patient, who, at the beginning of the operation had presented normal pressures, frank shock has occurred. If these low pressures are continued without improvement for more than half an hour, a vicious cycle is generally established, which, without adequate treatment will cause the death of the patient.

As the heart is fatigued by overwork, its muscle lengthens and with each subsequent contraction, fails to completely empty itself. With this dilitation and progressively falling pressures, the heart's own nourishment is reduced and is further embarrassed by the prolonged period of contraction—anemia from its rapid action. This reduced nourishment leads to further embarrassment thus forming the vicious cycle. The vicious cycle thus established may require hours or days to finally completely wear out the heart.

Ether and chloroform reduce the pulse pressure and may initiate shock by their action on the heart in reducing its output, thus disturbing the balance between the arterioles and the heart, followed sooner or later by an increase in pulse rate; while surgery through traction on organs, trauma to nerve trunks, irritation of large areas of peritoneum with gauze, or the loss of blood, usually disturbs the balance by causing peripheral dilitation almost invariably observed in the abdomen as the early appearance of marked congestion. After the balance has been disturbed at either end, both the arterioles and the heart participate in the further development of shock if the cause still continues.

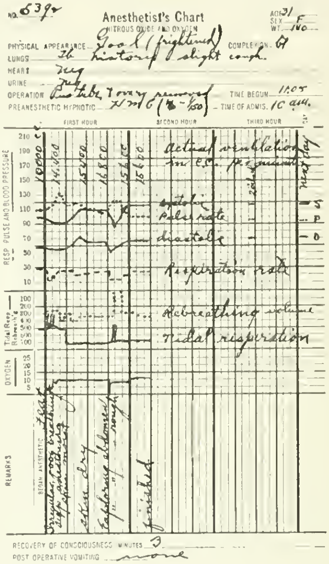
There are so few conditions in which blood pressures increase during an operation, that the danger of hypertension developing on the table, I believe, may be generally eliminated. In my experience I have never seen a systolic pressure increase during an operation more than a patient is able to increase blood pressure by straining at stool, which may be considered a normal, or a physiological rise. There is no anesthetic with which I am familiar, which will produce a rise in blood pressure after the first stage has passed, although nitrous oxid has been incorrectly so accused in much of the old literature. The greater the length of time and struggling in the first stage, the more frequently a rise occurs. It is, therefore, most commonly seen in the first stage of ether.

The influence of respiration on blood pressure during general anesthesia is due to a more or less obstructed airway, to the position of the patient on the table which may embarrass respiration, by the weight of the arms across the chest, if so placed, by leaning, assistants, or the Trendelenberg position.

Ordinarily, on inhalation, diastolic and systolic pressures are from 5 to 20 m.m. lower than on exhalation. When the obstruction in the airway produces marked snoring the variations may be greater, amounting to as much as 30 m.m. If the respirations are very rapid, however, respiratory variations in blood pressure are less marked.

On inhalation, blood is aspirated into the great veins, right heart, and pulmonary arteries, from all parts of the body; the pulmonary capilliaries are straightened out and dilated, allowing an increased flow of blood from the right ventricle, but delivering a decreased quantity of blood to the left auricle so that arterial pressure falls. On exhalation, this blood-saturated-lung is compressed by the air within, and the chest wall without, thus forcing an increased quantity of blood into the left heart and systematic circulation and elevating the pressure for two or three heart beats; at the same moment, the compression in the lungs has a tendency to dam back the blood from entering the thoracic cavity, and when the obstruction to respiration is marked, the result is an increased peripheral venous congestion, especially noticeable in the head and neck. If the lungs are *kept inflated under considerable pressure,* the pulse and diastolic pressures both fall, imperfect ventilation results, venous congestion or cyanosis immediately supervene. The pulmonary obstruction or capillary compression may cause right heart dilitation.

The respiratory variation in blood pressure is measured as follows: The pressure in the cuff is pumped above the systolic pressure; then as the pressure is gradually released we listen for the first clear pulse tone which occurs during exhalation. This is the *expiratory* systolic pressure. As the pressure in the cuff falls gradually we hear faint pulse tones during inhalation, but these are disregarded until they are of equal intensity to the one first noted in exhalation. When such a tone is heard the *inspiratory* systolic reading is made.



Case No. 5392 illustrates several things. In the first place the patient had too small a dose of morphin and hyoscin for her temperment and came to the operation thoroughly scared, breathing 30 times a minute, pulse on systolic pressure only 100, diastolic 58. The ventilation of 13000 c.c. per minute had so reduced the CO_2 that the patient was already on the way to shock before the operation had begun, and this tendency was further increased for the first 15 minutes, but by rebreathing 400 c.c. of each breath, beginning this large rebreathing on the 10 minute line, the heart rate became slower progressively, while the blood pressures increased to their normal by the end of the operation. This patient actually left the table in better condition than when she came on, and remained so, as shown by the pulse and pressures at 2 o'clock and again the next day.

The notch in the diastolic pressure was caused by rough handling in exploring the abdomen at the 45 minute line. It was followed immediately by a fall in the systolic pressure and a rise in the pulse rate but as soon as the cause was discontinued, the pulse and pressures began to recover, showing that the shock-producing-influence had not been so prolonged as to exhaust the cardio-arteriole musculature.

The difference between the inspiratory and expiratory readings is the respiratory influence on systolic blood pressure. Inspiratory and expiratory diastolic pressures are obtained in the same manner.

From clinical observation in taking these pressures, it appears that in obese patients, in whom the airway at the base of the tongue is kept free by means of a pharyngeal tube, that the weight of the chest wall in some way obstructs exhalation, possibly by collapsing the smaller branches of the bronchial tree, and thus interfering with the pulmonary circulation, dams back the blood and produces venous congestion and cyanosis.

The accompanying chart serves to illustrate some common clinical observations of blood pressure, pulse, and respiration during major operations.

2233 ASHLAND AVENUE.

DISCUSSION.

DR. MONTFORT, Chicago: The anesthetist and surgeon should take into consideration the favorable action of H. M. C. previous to giving the anesthetic. I have had opportunity to see H. M. C. used by W. F. Waugh, the originator of that form of anesthetic and know what effect H. M. C. has on blood pressure and in the prophylaxis of shock.

DR. JAMES T. GWATHEMY: I think this is a very important paper. Blood pressure is something that very few of us know anything about from a practical standpoint. If everything Dr. McKesson says is true, then all anesthetists should study blood pressure in relation to anesthesia. He has stated that shock would be indicated by the blood pressure at least fifteen minutes before any clinical sign. If that is so, it would be almost criminal to neglect to take the blood pressure. I would like to have Dr. McKesson bring out in his closing remarks exactly how he has determined this time warning in regard to shock.

DR. F. D. BULLARD, Los Angeles: I would like to have the doctor bring out a little more the question as to the influence of the Trendelenburg's position. I frequently have requested my surgeons not to use that position for any prolonged time I have noticed that prolonged Trendelenburg position is very deleterious to the patient.

DR. MARY E. BOTSFORD, San Francisco: I feel that I am not in position to discuss this paper, because unfortunately I never availed myself of this great advantage, which it certainly must be. I should think it would be a very wise thing to have it adopted as part of the ordinary method of anesthesia. Ordinarily the anesthetist is obliged to be keen enough to discover symptoms of shock more than fifteen minutes before it occurs. I would like to ask the doctor what in his opinion is the factor which most of all produces this rather sudden drop in blood pressure as shown in one of his charts. I should also like to say that I agree with him that it is many times produced by an inefficient assistant.

DR. J. E. ENGSTAD: Have you noticed a sudden drop of pulse pressure in changing from the Trendelenburg to normal and normal to the Trendelenburg positions? Surgeons say it is dangerous to change from the Trendelenburg position to the horizontal quickly, that you should allow a half minute for the change.

DR. E. I. MCKESSON, closing: In regard to the use of the H. M. C. tablet, of course, it would take a very large number of charts of practically uniform kinds of operation and uniform patients, to show any change between those patients with H. M. C. and those without. I have not made a careful study of such a series, so what I would say would be an impression, and not based on real observations. My impression is, that H. M. C., or morphin and hyoscin, previous to operation, say one and a half to two hours before, administered in proper dosage, sustains blood pressure rather than acts as a depressant.

The interpretation of the blood pressure picture brought up by Dr. Gwathmey as a sign of approaching shock prior to the time that we are able to detect it by feeling the pulse is a little complicated. It involves the rate of the pulse and the ratio between the pulse pressure and the diastolic pressure so that it is a *composite* picture. To say that the lessening of pulse pressure indicates that your patient is going into shock may not be correct, because the blood pressure may be brought up adequately as a compensatory effect, by an increase in pulse rate. Again, to say that because your pulse rate is maintained, that the patient is *not* approaching shock would be just as erroneous, because if you take the blood pressures you may find the systolic or diastolic pressures coming down, which is evidence sufficient that when these pressures decrease more than ten per cent. your patient is *approaching* shock. You can extend the pulse, diastolic and systolic curves on the chart and, allowing for surgical work, locate a future time on the chart at which the pressures are low enough to institute shock and the shock cycle in the heart. The length of time that you can anticipate the development of shock by this method varies from fifteen to forty-five minutes. Some patients have a great deal of reserve power—to use the slang of the day, a good deal of "pep"—a great deal of strength to come back, while another person who has been exhausted by cardiac over-work, the blood pressure picture may show that the heart has been exhausted or nearly exhausted up to the time of operation. That patient will develop shock more rapidly So, reserve power must be considered in giving a prognosis.

As to the Trendelenburg position, I would not advise it for long periods, especially with the surgery it accompanies, for your patient soon develops more or less shock, and very often *more* than *less*. Personally, I will not put a patient in an extreme Trendelenburg position for anybody. (Applause)

What factor produces the sharp drop in blood pressure? In the chart shown it was due to a ligature slipping off the renal artery. But the thing that is common, that you and I see every day, is this pulling and hauling and rough handling. You talk to the surgeon and he will say: "I believe in handling the tissues gently," but at the same time he may be pulling. He does not seem to realize that he is doing anything to cause his patient shock and the only way you can convince him is to show him chart after chart where, when he begins to pull or uses large abdominal packs, his patient develops shock.

In regard to changing quickly from the one position to another affecting the blood pressure, blood pressure does not make the change as quickly as that, unless your patient is deeply anesthetized, then any change of position will produce a corresponding change of blood pressure. But if your patient has an approximately normal tonus, the cardiovascular system has the power to accommodate itself, and the change from the Trendelenburg to a horizontal position will not cause immediate change in pressure. The change will commence probably during the following five or ten minutes.

ETHER AS AN ANTIDOTE FOR COCAIN AND NOVOCAIN POISONING.*

J. E. ENGSTAD, M.D.,
MINNEAPOLIS, MINN.

In the year 1910 I published an article in the Journal of the A. M. A. under this title, *Ether an Antidote of Cocaine and Novocaine*, giving the history of a few cases and a résumé of what was known of the action of ether and cocain on the human system, both in large and in small doses.

Since that time my clinical experience has been further enlarged by having the opportunity to test the action of ether in a large number of cases of poisoning from the alkaloid of cocoa leaves.

In addition, from time to time, cases have been reported which all tend to confirm my earlier claims for ether as a safe, and in the majority of cases, certain antidote for the subtle and dangerous alkaloid cocain as well as any of the synthetical preparations, whose properties and chemical combination are allied to cocain.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, in San Francisco, June 21, 1915.

Cocain lowers the blood pressure with a tendency to inhibit the complete systolic action of the heart, especially of the right side. It also inhibits the respiratory action due to poisoning of the respiratory centers of the brain; the heart becomes flabby and there may be an over stimulation of the excelerator nerves.

When the right side of the heart does not synchronize either in systole or diastole, this form of heart block, in cases of cocain poisoning, may be due to anesthetizing of the bundle of His, by the direct action of the drug circulating in the blood.

Ether is a rapidly acting diffusible cardiac stimulant; it stimulates the vaso-motor as well as the respiratory centers; it increases the blood pressure and has apparently a special affinity for the toxic elements of the diffusible alkaloids. If this affinity is due to the ether molecule entering the cells of the central nervous system, neutralizing the toxic action of cocain, or desensitizing the active principle of the drug, or if it changes the toxic molecule into a less harmful combination to the animal organism, it is still unknown.

Dr. Corbit of the University of Minnesota, has conducted a number of experiments with novocain, by injecting this drug directly into the veins of animals, and he has experimently confirmed what was clinically known for a number of years, that ether is a safe and efficient antidote for the alkaloid cocain and any synthetical preparation, allied in action. He reports: *"I find that the injection of solutions of novocain directly into the veins in unanesthetized animals frequently produces toxic symptoms, manifested by tetanic spasm of the voluntary muscles of the back, and marked respiratory embarrassment. I have found that a fatal outcome in these cases could be prevented by the administration of ether.*

"While this is a matter that has been developed by you in a clinical way, I feel that very little has been done in experimental work, and possibly this may aid you in the propaganda for the prevention of death from novocain poisoning. In addition, I want to say that I am very much pleased that you are taking this matter up and are again popularizing it."

Clinically there are a large number of cases which have come under my observation and under the observation of other surgeons who have resorted to the use of this article in accidental poisoning.

When cocain was first brought to the attention of the medical profession, its poisonous character was not recognized until a large number of deaths had been reported, and it is doubtful if half of the accident cases due to its indiscriminate use were ever heard of. I had practiced medicine a number of years when cocain was first brought to the attention of the profession and was being hailed as a *cure-all,* free from danger.

Its toll of life would have been enormous had it not been for the exorbitant price which prevented its extensive use until its dangerous properties were brought to the attention of the public. Its reckless use, especially by the dentists, gave me an extended experience in cases of poisoning from this drug. One dentist called me repeatedly to his office on the same floor, to resuscitate cases of poisoning from cocain used to minimize pain in the extraction of teeth. This dentist, in common with so many of this period, disregarded all my warnings of its danger, ascribing the peculiar nervous disturbances of its action to hysteria.

In the first few cases I was called on to treat, strychnin and morphin in combination were used with marked benefit. But as cases kept multiplying, I found the action of these drugs too slow, and I decided that there must be something to counteract the poison more rapidly when life was in extreme danger. It was necessary to find a remedy that could be administered at any time and be instantaneous in its action. After a little experimentation, I soon found ether to be the required drug. This was administered as ordinarily given to produce surgical narcosis; that is, to the stage of stimulation of the vaso-motor system and of the respiratory centers, of the brain and of the pneumogastric nerve which increases the pulmonary circulation in the first stages. We know that cocain inhibits the action of the heart, especially on the right side, and it has a marked inhibitory action on the respiratory centers of the brain, and death may occur from feeble respiratory movements of the so-called Cheyne-Stokes type, or asphyxia.

To me ether has proved extremely valuable in what seemed hopeless cases of cocain poisoning. It stimulates the heart and the respiratory system almost instantly and the pulse becomes fuller at once and of normal tension. The marked mental excitement is allayed as the patient goes under the influence of the ether and the effect of the poison rapidly disappears. The individual regains consciousness as soon as the effect of the small amount of ether has disappeared if its administration only is carried to the stage of analgesia.

To get the best results, the anesthetic is administered only to the degree of mild surgical analgesia, or at times, even less than this. A mask should be employed and the ether given by the drop method. This is all-important. Given by the old method the ether would only add to the danger of asphyxia by excluding air from the lungs engorged with venous blood.

My last case, a typical cocain poisoning, was the patient of a very conservative and capable oculist, who had instilled a few drops of a 2 per cent. cocain solution in an eye for obtunding the lachrymal duct previous to its dilitation, and, as the duct was pervious, part of the solution had evidently entered the nasal mucus membrane and been rapidly absorbed.

The patient, a girl aged twelve, exhibited symptoms of extreme restlessness complicated with dyspnea, with respiratory movements of about 40, the respiration generally intercostal, with an occasional diaphramic sighing inspiration. There was a peculiar pallor of the face, eyes large and pupils dilated, and a persistent restlessness and extreme anxiety which is characteristic in this form of poisoning. The pulse was barely perceptible. Ether had been brought, and the confidence I had in its action and potency tempted me to remark that the child's third or fourth respiratory movement after the first whiffs of ether would be normal ones, and that her recovery would be almost instantaneous. True to my prediction, the fourth respiration was normal and almost immediately the respiratory movements became entirely natural, and pulse regained its tension, the mind became clear and calm, and the anxious expression gave way to one of well being and peace.

Syndicate Building.

DISCUSSION.

Dr. Carl G. Parsons, Denver, Colorado: I have been indebted to Dr. Engstad for a number of years, ever since reading his article in 1910 on the subject of an antidote for novocain and cocain, especially in spinal anesthesia. I have had collapses in several cases where I have given spinal anesthesia, and almost immediately a few whiffs of ether would bring the patient around.

A member at the meeting of the Western Surgical and Gynecological Association told of a physician who was working at the laboratories at the university, and his wife was in the dental chair. He got a telephone that she had collapsed under an injection of cocain into the gum. The amount was not large, so it was a real case of cocain poisoning. This doctor said there must be some way of giving an antidote in these cases, and I told him of ether and he was very glad to know it.

When a man like Dr. Engstad has solved a problem that he has been working on for fifteen years he ought to have recognition for his results, and his treatment should be known as *Engstad's Method*.

Dr. James T. Gwathmey: I would like to ask how the doctor gives the ether. I suppose by the drop method?

Dr. J. E. Engstad: I give it on a mask so the patient can get the air mixed with ether. We must not exclude air, because the patient is really suffering from asphyxia. The method is just a few drops on the mask. The quantity, sometimes twenty or thirty drops. I doubt if I have ever administered four grams. Just two or three shakes of the ether bottle on the mask and the patient will revive and we have no further need for stimulants.

Dr. George W. Kennedy, Sharon, Pennsylvania: What is the physiology of the antidote?

Dr. J. E. Engstad I will read from the paper:

"It increases the blood pressure and has apparently a special affinity for the toxic elements of the diffusible alkaloids. If this affinity is due to the ether molecule entering the cells of the central nervous system, neutralizing the toxic action of cocain, by desensitizing the active principle of the drug; or if it changes the toxic molecule into a less harmful combination to the animal organism, is still unknown."

THE RELATION OF VENTRICULAR FIBRILLATION TO CLINICAL CHLOROFORM SYNCOPE.*

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Melbourne, Australia.

Since McWilliam in a British Medical Journal of 1889 drew attention to ventricular fibrillation as a form of sudden circulatory failure and death, very little had been written upon the subject until Dr. Goodman Levy published his first communication in a Journal of Physiology of 1911 upon its relation with chloroform and adrenalin. Since that time Levy has contributed more valuable data of great interest upon the subject.

It is a circumstance of much significance that those experimental physiologists who have worked with dogs in the elucidation of clinical problems, should have reported no observation upon the occurrence of ventricular fibrillation. Nor is this owing to any experimental difficulties in eliciting the phenomen nor of interpreting it when it has happened, since it is readily recognizable and may be frequently observed in the laboratory when cats are used for experimentation under chloroform. I have found it to occur during the administration of chloroform to three out of five successive cats, whilst out of several hundred successive dogs in which death had been caused designedly by chloroform under a great variety of conditions, I have never observed it except as a terminal process when the blood pressure had fallen very low from shock or some other cause—quite a distinct event from that form of fatal syncope in cats.

There is no doubt as to the occurrence of ventricular fibrillation in cats during the administration of chloroform. There is also no doubt about the absence or infreqnency of its occurrence under chloroform in dogs. Owing to this circumstance the employment of data obtained from cats in this relation ought to be very guarded in the interpretation of clinical phenomena.

Levy, however, contends that the analogy between this form of death in the cat and the clinical form of chloroform syncope is so close as to warrant the assumption of a common causation—ventricular fibrillation. McWilliam qualifies a like assumption.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, June 21, 1915

Both McWilliam and Levy refer to the frequency of occurrence of syncope in cats due to ventricular fibrillation. both during induction and reinduction of chloroform anesthesia. McWilliam more than Levy finds it occur at *any* period during chloroform anesthesia. McWilliam, however, contends for an abnormal condition of the circulation, as a necessary factor accompanying that of chloroform. This does not appear to have been Levy's experience and it certainly has not been mine. Levy has extensively investigated the conditions supplementing the chloroform factor.

A characteristic of the circulatory apparatus of the cat is the readiness with which changes occur in the cardiac rhythm under the reflex influence of the various forms of afferent nervous impulse. Vagus impulses are inhibited and those of the accelerator mechanism substituted, the normal rhythm of 120 or so beats suddenly changing to one of 350 or so beats to the minute. When the sensory impulses arise from the mucous membrane of the respiratory tract, as when weak ammonia, oil of mustard or chloroform vapour is inspired, a marked difference is noticeable in the regularity of the heart's rhythm between that occasioned by chloroform and that of the other substances. The accelerator rhythm with chloroform is markedly intermittent, whereas that with ammonia and other irritants is practically free from intermissions. This intermittent feature is a very important peculiarity of the chloroform action. It ocurs before anesthesia sets in, and during its period of incidence ventricular fibrillation may occur. The intermissions appear to be due in part to the temporary periods of ventricular fibrillation and part of the temporary return of vagus innervation arising as a consequence of exaltation of the excitability of this nerve by the chloroform. The latter irregularity is cut out by atropine. If, however, during the period of irregular cardiac action, ventricular fibrillation does not set in, narcosis deepens and anesthesia comes on. With the onset of anesthesia the afferent impulses cease. This circumstance together with the exaltation of vagus excitability by the chloroform, restores the vagus control of the heart rhythm. The restoration of vagus rhythm is indicated usually by the sudden change from the rapid accelerator to the normal or slower rhythm. Fibrillation does not now occur. The tonic systolic contractions of the vagal rhythm has a decided influence in checking incoordinate ventricular muscle contraction. There is uniformity in the experimental observations on this point.

This series of events occurs again and again in reinductions of chloroform anesthesia. The excitability of the vagi of the cat does not become depressed by the chloroform anesthesia as happens with the dog under the same circumstances. This doubtless is due to the excitability of this mechanism in the dog being raised to great activity by induction, whilst on the other hand the degree of exalted excitability in the cat is relatively feeble.

It is to the fact that ventricular fibrillation occurs only in the pre-anesthetic stage in cats that Levy has been led to assert that the danger from chloroform lies in the induction of anesthesia by what has hitherto been regarded as concentrations within the limits of safety.

There is a striking discordancy between this picture of the induction of chloroform anesthesia in the cat and that under the same conditions in the dog. Some intermissions occur during the pre-anesthetic struggling of the dog. This is preventable by atropine or vagotomy. There appear to be no temporary onsets of ventricular fibrillation. If prolonged or permanent inhibition of the heart sets in, it occurs at the end of induction, or in the case of the morphinised dog, somewhat later. This is a common occurrence and one of the most striking phenomena of chloroform narcosis in the dog. The syncope of the dog from chloroform appears to be of the vagal type only. It is not easy to kill a vagotomised dog with chloroform.

The syncope of the dog is not merely due to inhibition of the heart by the vagi. The vaso-constrictor mechanism is coordinately inhibited. This form of syncope arises from a high tension of chloroform in the arterial blood, exalting the excitability of the vagus and vaso-motor mechanisms, and at the same time depressing that of the myocardium.

It is probable that no clinical fatalities arise as a consequence of a general high tension of chloroform throughout the entire blood mass and tissues of the body. Such a tension is brought about relatively slowly, consequently the progress of general circulatory and medullary depression is relatively slow. Further accessions to the tension of the chloroform in the blood are prevented by failure of respiration. Thereupon artificial respiration lowers the tension of chloroform in the system to a level consistent with respiratory activity. There is always plenty of warning of the oncoming depression.

Syncope from cardio-vascular inhibition is the result of the intake of excessive concentrations of chloroform vapour during normal breathing or to excessive inspirations of concentrations not otherwise too high. It does not occur in the normal breathing of concentrations within the 2 per cent. limit. Over this it occurs with a frequency which increases with the increase of the concentration. The probability of recovery from this cardio-vascular form of syncope depends upon the degree of myocardial depression which the dog's heart has suffered before the incidence of inhibition. It is essentially the result of overdose.

With regard to overdose, Levy appears to have failed to recognize the distinction between an excessive tension of chloroform in the arterial blood and an excessive tension throughout the entire blood mass and tissues of the body as above described. The sudden rise of tension of chloroform in the arterial blood from excessive intake by breathing is similar to that which results from the injection of three drops of chloroform (diluted) into the external jugular vein in continuity. Such a dog dies or very nearly dies and from overdose. Hence Levy errs in contending that cases of early syncope cannot be due to overdose, and his interpretations of 76 clinical fatalities from chloroform as stated in the Proceedings The Royal Society of Medicine, 1914, Section vii., are fallacious accordingly.

My own experiments with cats indicate that fully established ventricular fibrillation is fatal. Neither heart massage nor any other measure appeared to have any effect upon it. Short periods of imperfect fibrillation recovered spontaneously. I cannot comment on McWilliams' case of recovery after an hour of heart massage and the use of pilocarpine.

Whether centricular fibrillation or cardio-vascular inhibition is the cause of clinical chloroform syncope must rest with that form, the analogies of which to the clinical syncope offer the greater approximation.

The respective analogies are set forth as follows:

(1) Syncope of cardio-vascular inhibition occurs in dogs only in the period of induction. This also is the period of incidence of clinical chloroform syncope. Ventricular fibrillation may occur at any time during the course of prolonged administration during reinduction after temporary recovery.

(2) Cardio-vascular syncope in the dog is frequently recovered from by artificial respiration alone or together with heart massage. This coincides with the recovery from syncope in clinical instances. In my experience established syncope from ventricular fibrillation is not recovered from, or if recovery occurs, it must be very rare.

(3) The control of the cardiac rhythm in the dog is markedly vagal and it approximates in this respect to that of the human. In the cat on the other hand well marked vagal control is not characteristic and vagal control as prevails is readily inhibited. A heart under vagus control is not prone to ventricular fibrillation. Hence the cat's heart should be more prone to ventricular fibrillation than that of the dog.

(4) Reflex syncope from cardio-vascular inhibition in dogs may occur as readily as the reflex syncope from ventricular fibrillation in cats.

(5) Syncopal states occur clinically either reflexly or from overdosage in which the heart does not stop, but becomes very slow, resembling similar states occurring in the dog from the effects of chloroform, and correctable by vagotomy.

This statement appears to me to show a balance of probability in favour of cardio-vascular inhibition as being the cause of clinical chloroform syncope.

Under these circumstances Levy's contention that *"the exercise of care against overdosage in the administration of chloroform is wrong,"* must be regarded as unwarranted by the evidence and as a dangerous and unreasonable teaching.

"The Thornbury," La Trobe Street.

DISCUSSION.

Dr. James T. Gwathmey, New York City: I believe that the unreasonable prejudice that exists against chloroform in a great many quarters is due to the fact that the laboratory findings in regard to chloroform have been made by men who are not practical anesthetists. They have been made by laboratory workers who do not understand the finer points of anesthesia, and in explaining the figures as I have seen them explained by men prominent in the physiological field, it seems to me that we must study their findings with a great deal of caution. The Germans have proven beyond question that if chloroform and oxygen and air is given by the Roth-Drager apparatus, with the chloroform, oxygen and air measured by volume, the patient suffers no toxic effects, but comes out, as from a nitrous oxid-oxygen anestheia in a perfectly clear state of mind. As determined by measures taken to ascertain toxicity, patients are just as safe with chloroform under these conditions as any anesthetic. The blood pressure is maintained perfectly and shock does not occur any more rapidly with chloroform as given in this way than under local anesthesia.

In regard to sudden cardiac inhibition, I think there is no question that it would occur in certain conditions, but I think very few of us would have the temerity to give chloroform unless the patient had been previously given morphin or atropin. But if these things have been attended to, anesthesia with chloroform is perfectly safe and justifiable, provided we know that over-concentration must be guarded against. In giving chloroform, as I have given it in several thousand cases without any fear and with absolute assurance, I have always had in mind the fact that after delivering one to five drops upon the mask, this amount must be taken into the system diluted with air, waiting one or two minutes at least before the dose is repeated, and in that way I avoid giving over two per cent of chloroform. Then when patients go into the second stage of anesthesia switch to ether, and we have a perfectly safe sequence; just as safe as the nitrous oxid and ether sequence. It seems to me that if we as a society are, as suggested by Dr. Bullard, to give our voice of approval or disapproval to some form of anesthesia, we should say that the gas and ether sequence should be a thing of the past. I know of one or two deaths in New York that have occurred under gas-ether. It should be gas-oxygen-ether. The same way with chloroform. With proper chloroform anesthesia, if we are careful during the first five minutes, we will have no trouble, but we must observe the proper dosage and pay strict attention to details of administration.

It is unfortunate that there is no center here in the United States in which this form of administering chloroform clinically obtains. If we do not give chloroform as it should be given, results are bad; but it should be given with known percentages of oxygen and air.

Dr. J. E. Engstad, Minneapolis: I believe it was Babcock of Chicago who brought out the theory that in cases of sudden fatallities following any poisoning by chloroform, or ether, or novocain, death is due to the action of the bundle of His in the heart, which causes heart block. It is not due to the reflex centers, or the respiratory centers, but particularly to the nervous center of the heart, the bundle of His.

STATUS LYMPHATICUS IN RELATION TO GENERAL ANESTHESIA.*

Jean Margaret Roberts, M.D.,
Los Angeles, Cal.

Our absolute knowledge of the condition called *Status Lymphaticus* is very small, but I think the type of patient suspected of this condition has become better defined in the minds of diagnosticians. My intimate acquaintance with status lymphaticus dates from an operation performed in July of 1912 for removal of tonsils and adenoids. This case I will discuss later.

The problem is a previous diagnosis and not an autopsy diagnosis of these so-called cases of status lymphaticus. The predominant view of pathologists is that the lymphatic hyperplasia has nothing to do with the mechanism of the sudden death, but is only a mark of some pre-existing abnormal constitution in which the vital organs are immediately and fatally deranged by quite trivial causes. So pathologists have adopted the doctrine of a subtle constitutional change in the various cells of the body which remains concealed until the catastrophe takes place. Other theories are that the enlarged thymus acts mechanically on the trachea, interferes with the vagus nerve or excites reflex spasm of the glottis. Again, that toxins produced by the thymus cause cardiac paralysis.

Diagnosis of a Patient Suspected of Status Lymphaticus: In the male there are feminine characteristics, pale, smooth, soft, delicate texture of skin; an abundant amount of subcutaneous fat; extremities well-formed and rounded, hair scanty on all parts of body. In the female there are male characteristics: deep base voice, hair on face, narrow chest and hips. Nearly all are blondes. In children there is more or less dyspnea, a typical adenoid expression, pale, with thick, large, short and stocky neck; and flabby fat. Palpitation of the thymus is difficult, as the glands of the neck are often enlarged, but if on percussion one finds an area of impaired resonance over the manubrium sterni, an x-ray may confirm a diagnosis of enlarged thymus, but always keep in mind enlarged deep cervical glands.

Knowledge of the thymus is limited. That it has an internal secretion is certain, for experiments on animals of removal of the gland soon after birth leads to changes resembling rickets. The size of the gland is indefinite, many think it increases in size and weight up to about the age of fifteen, after which time it normally undergoes gradual involution. The normal weight during infancy is from ten to twenty grams, and at puberty may increase to forty grams.

Most of the cases reported when death has occurred early in an operation were cases where chloroform or like anesthetics were used, and showed cardiac failure first, followed by respiratory failure afterwards. While those cases when ether was used died towards the end or after the operation and showed respiratory failure first and cardiac failure afterward.

Lymphatic cases are difficult to anesthetize, hard to keep quiet; the throat is full of adenoid tissue making breathing difficult; the tongue is thick and neck short and stocky. They are a poor risk and avoid operation if possible. If an anesthetic is to be given use the lightest, shortest anesthetic and urge rapid work. Nitrous oxid-oxygen anesthesia is to be preferred, while nitrous oxide-ether by the vapor method may be used for tonsil and adenoid work at no time producing too deep anesthesia.

REPORT OF CASE.

Girl, aged 5, blonde, well nourished, stocky, adenoid type of face. Examination: large tonsils and adenoids; heart and lungs negative. I gave an ether vapor anesthetic. She became cyanotic; we judged on account of her throat being full of adenoid tissue, for after the removal of one tonsil her breathing and color improved and the operation continued and finished in a few minutes with an uneventful recovery. Two weeks later the child had an attack of dyspnea, became cyanotic and died in ten minutes of heart failure. An autopsy was held with the typical status lymphaticus picture, which consisted of a hyperplasia of the thymus and lymphatic glands of the body. The weight of the thymus was 75 grams. There was also edema of the lungs.

DISCUSSION.

Dr. Mary E. Botsford, San Francisco: I had an opportunity at one time of anesthetizing in succession five children in whom the diagnosis had been previously made by Dr. Moffit of San Francisco. The children were of rather a better type than those in whom status lymphaticus is usually found. They were anesthetized by gas oxygen as a preliminary, with ether by the vapor method. There was no serious condition afterwards. It may have been an accident that no fatality was recorded in the series.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, in San Francisco, June 21, 1915.

Dr. F. D. Bullard, Los Angeles: I have been called twice by the coroner of Los Angeles to be present at the autopsy in cases of status lymphaticus. In each case the operation was for removal of adenoids and tonsils. We found a very large thymus gland and in each case chloroform had been used. I think Dr. Roberts, of Pasadena, said there were about twelve cases in southern California of deaths from the adenoid and tonsil operation, and all following chloroform. So under no conditions would I give chloroform for a tonsillary operation. Very few people in our section will do so now. The method that I think is best, if you have not nitrous oxid, is to give the ether by the "Rausch" method and using warm ether. I have never seen ether given in this way that was over ninety seconds in getting results. I suppose you are all aware you can put anybody to sleep in ninety seconds if the ether is warm. I know the blood pressure is increased, but I have handled a number of cases of status lymphaticus by warm ether. The "Ether Rausch" was discovered by a German a few years ago. We Americans had used it for twenty years before. I began to give anesthetics in 1892 and gave it then. Down in Southern California we passed a resolution that we never would allow anybody to give chloroform for the tonsil and adenoid operations. I should like to see this Association do something of that kind.

Dr. Mary T. Murphy, San Francisco: I would like to ask Dr. Roberts if the patients she has seen have had nitrous oxid as a preliminary to the anesthesia. I think we should lay a great deal of stress on that, particularly with children. I have rather an extensive practice with children, and in using nitrous oxid unconsciousness is gained so rapidly, the secretions are lessened, the anesthesia is very much quieter and smoother, and the element of fear is done away with, and I think so much, in a case of status lymphaticus, depends upon the fear in the mind of the child.

Dr. James T. Gwathmey, New York City: I think it is Doctor Skeel of Philadelphia who has reported over 5,000 cases of adenoid and tonsil operation with chloroform, with no bad results whatever. It seems to me it would be wrong for this society to pass any such resolution as is suggested. I do not think the anesthetic has so much to do with the fact of death as the way it is administered. As the last speaker has said, in cases of status lymphaticus the question of fright comes up very prominently, and if we can eliminate fright it does not make any difference what the anesthetic is, provided, of course, that the anesthesia is not too deep or prolonged. Of course, I know the general consensus of opinion is that chloroform is contraindicated in these cases, but I do not think any anesthetist would use chloroform if the case was diagnosed as status lymphaticus. At the same time there might be certain other elements that might come up; it seems to me it would be very much better to use chloroform rather than nitrous oxid in the presence of existing cyanosis. Status lymphaticus as a rule is diagnosed after death and not before, and I think it has quite often been taken as an excuse for improper and unnecessary dosage of anesthetic, or poor methods of administration rather than as the real causative factor of fatalities. Death has followed the use of nitrous oxid in cases that have been diagnosed as status lymphaticus, as well as chloroform or ether, so nitrous oxid is not a prophylactic. The principal thing is to do away with the element of fear in some way.

Dr. Charles K. Teter, Cleveland, Ohio: Personally, I have never seen a case of status lymphaticus, and I should have run across them in administering anesthetics. I have had over 6,000 children, but have never had a fatal case; and over 13,000 anesthetics for major surgery, with only one fatal case, and that was not status lymphaticus. In addition to that, 19,000 for dental surgery, without a single fatal case. So I have noticed that status lymphaticus occurs where they have a good many anesthetic deaths. As a rule the anesthetist gets the blame, and I am glad the anesthetist can blame status lymphaticus.

Dr. J. Margaret Roberts, (closing): I have nothing further to add except that I have seen one or two cases where the patient had a full stomach—but the patient died of status lymphaticus.

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THE ESSENTIALS OF ANESTHESIA FROM THE STANDPOINT OF THE OPERATOR.*

Roland E. Skeel, M.D., F.A.C.S.,
Cleveland, Ohio.

It is with a certain timidity that I venture before this society to put forth some ideas regarding a very hackneyed subject, "The Essentials of Anesthesia from the Standpoint of the Operator," because I can perhaps do nothing more than present some old ideas from a new angle.

If we consider the status of surgery in general at the time of the discovery of the anesthetic properties of ether, we at once note that at that time the limitations of operative surgery were so marked and the risks of death from sepsis so great, that one thing only was required of an anesthetic—*the abolition of pain during the performance of an operation.* In a relative sense the risk of the anesthetic was nil. Neither the delicate manipulations of brain surgery, the extensive exploration of the abdominal cavity, nor the specialized types of the surgery of the thorax were dreamed of, and the minute balancing of risks which we consider imperative at present were then not thought of.

With the abolition of infection and the invasion of the serous cavities of the body without septic risk, there arose considerations aside from the mitigation of suffering and, while that stands perhaps as the first essential of anesthesia to-day, it is also demanded of it that *the risk of life shall be negligible; that it shall be produced comfortably and conveniently; that post-anesthetic discomfort shall be trivial; and that the anesthetized patient shall be in such condition that the proposed surgical procedure may be carried out quickly, safely and without other injury to the tissues than that which is inherent in the operation to be performed.*

It is needless to point out to this body that the anesthetic properties of nitrous oxid, ether, and chloroform were all discovered or proven within a comparatively short time of each other, and that chloroform rapidly gained its place as the anesthetic of choice because it was perfect in its abolition of pain, was rapid in its action, and was not too dangerous for the position which an anesthetic then occupied. An occasional fatality occurred, to be sure, but that was accepted as inevitable, and the infrequent catastrophe was lost sight of in the midst of the relatively greater disasters of sepsis, and, moreover, *any* agent which abolished the horrible pain of an amputation or a lithotomy was such a Godsend that the risks of its use were hardly to be considered. As true surgical deaths became fewer in spite of the invasion of cavities previously held to be sacred, the occasional chloroform death became a very distinct factor in surgical mortality, and when finally its destructive action on the liver cells was demonstrated, it became evident that its gross mortality was too great to allow it to remain as the anesthetic of choice under all circumstances.

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* Read before the New York Society of Anesthetists, November 15, 1913.

The exact mortality for chloroform anesthesia is unknown. As I write these lines the very practical, but somewhat dogmatic, paper of Dr. Bevan is brought to my attention giving the mortality rate for chloroform as being from 1-1000 to 1-3000, but owing to factors with which this body is familiar, it is obvious that there is no place in which the statistics of mortality are more unreliable than in those of anesthesia, and mortality statistics in general are about as unreliable as anything well can be.

I think, however, all will agree that chloroform danger is a real one, and without putting it in figures, one feels that it is too distinct to allow of its use under any other than exceptional circumstances. My own feelings regarding chloroform is such, that if it must be given and a man with wide chloroform experience is not available, I give it myself until the patient is completely under and operate with one eye on the anesthetic from that time on. The average interne, accustomed to the use of ether, with a chloroform bottle in his hand is about as dangerous an individual as can well be imagined.

Because of the extremely narrow margin between chloroform anesthesia and chloroform death, ether gradually superseded chloroform among those surgeons who operated upon a sufficiently large number of patients to be able to appreciate the relative safety of the one and the relative danger of the other, but so soon as the use of ether became popular it also was found to have some serious drawbacks. As given with a closed mask during my anesthetic days, it terrified every patient with its nasty, irritating odor and the sense of impending suffocation which it produced, but death on the table was extremely rare. As administered at present after preliminary nitrous oxid or with the open cone or as warm ether vapor, or even by one of the closed methods if the patient is not strangled, it is not so unpleasant and terror and struggling are not often in evidence.

It irritates the respiratory mucosa, however, causes increased secretion from the nose, throat, and bronchial tubes, and the inhaled mucous and saliva, or the diminution in resistance to infection for which the irritation is responsible, or some factor with which we are not wholly conversant, leads to post-operative respiratory complications more often than is satisfactory. Again statistics are of no value, but the impressions which one gains after years of almost daily use are a far better guide, and if my own impressions are of any value, I am sure that the post-operative respiratory complications of ether are its most serious drawback. Its effect upon the kidneys, too, must be taken into consideration. In my own experience there have been two cases of post-operative nephritis with total suppression of urine which could be laid to nothing else than ether. Then again the ether vomiting has not, and apparently can not, be abolished. Washing out the stomach, olive oil in quantities, and saline infusions, all tend to minimize nausea, but a certain proportion of ether nausea is central just as a certain proportion of alcoholic nausea is central, and up to the present no method of doing away with this has been devised; nor does there seem to be any way of avoiding that which I can only call *ether retention,* in which a patient after either a short or long anesthesia carries the ether odor on the breath for two or three days and vomits until that odor disappears.

Ether then filled the one essential of being practically without danger on the table, but it had elements of danger later and its discomforts could not be wholly abolished. It is no wonder that surgeons and anesthetists were casting about for a method of anesthesia which would lack the immediate risks of chloroform and the discomfort and remote risks of ether, but it is strange indeed that until very recently so little effort was made to ascertain the value of nitrous oxid in this respect. Desultory attempts at its use were made now and then, but nothing systematic was done in spite of the fact that Andrews, in 1868, demonstrated the possibility of prolonged anesthesia by the combined use of nitrous oxid and oxygen.

Geographically speaking, I believe that to Cleveland belongs the credit for the introduction of the *systematic* use of nitrous oxid—oxygen—for anesthesia for general surgical procedures, but curiously enough, the first men to use it have been overlooked.

During the winter of 1902-3, Dr. N. Stone Scott, then one of Cleveland's younger and most active surgeons, induced his brother-in-law, Dr. Ernest E. Brown (now deceased) to experiment with nitrous oxid and oxygen, and from 1903 until Dr. Brown's removal from Cleveland Dr. Scott used nitrous oxid almost exclusively in his surgical work. I saw much of this and was so impressed by it that I had Dr. Brown give an occasional anesthetic for me, but its use did not become popularized until another team appeared on the scene composed of Dr. C. K. Teter as anesthetist and Dr. C. B. Parker as surgeon. Dr. Teter's apparatus was so superior to anything before used, and his personal skill and anesthetic knack so great, that nitrous oxid and oxygen were soon in great demand and Dr. Parker was able to present a paper reporting 218 personal cases anesthetized in this manner from July, 1904, to March 5th, 1907. Dr. Teter's first anesthetic for an abdominal operation was given to a patient of Dr. Parker's in July, 1904.

The first time in his experience that nitrous oxid and oxygen were preceded by a hypodermic of morphin was in a patient of my own in July, 1905, and in December, 1906, Dr. Teter and myself used a combination of local and light nitrous oxid and oxygen general anesthesia for an abdominal operation in a desperately ill patient who during convalescence from typhoid developed suppuration in an ovarian cyst. Also in December, 1906, nitrous oxid and oxygen was first given to a patient of Dr. G. W. Crile's, the anesthetist being Dr. Sloan, and in January, 1907, Dr. Teter gave nitrous oxid and oxygen to a patient of Dr. Crile's.

Thus the period from 1902-3 up to and including 1907 was marked by the opening of the present era of extensive use of nitrous oxid and oxygen as a general surgical anesthetic. During and since that time Dr. Teter has given 14,113 anesthetics for general surgical procedures, while it is also in constant use at Lakeside Hospital. Indeed, in a communication to the *Ohio State Medical Journal* for October, 1915, Dr. Wm. D. Fullerton states that the Lakeside Clinic has borne the brunt of the development of this method of anesthesia for major surgery.

I believe that it is true that the practically universal use of nitrous oxid and oxygen in the Lakeside Clinic has called more widespread attention to its value than the work of any other clinic or hospital, but this published statement does an injustice to the real pioneer in this work, who was Dr. Ernest E. Brown. If one also takes into consideration the fact that Dr. Teter had administered nitrous oxid and oxygen to 4,980 surgical patients previous to 1909-10, when he installed the nitrous oxid plant in Lakeside Hospital, and that the present method differs hardly at all from those Dr. Teter was then using, the erroneous nature of this statement is obvious. The error in all likelihood is wholly unintentional and but serves to illustrate how one's vision may be limited by his enthusiastic appreciation of his own colleagues and institutions. In like manner I may be overlooking some other man's work carried on either previous to, or coincidently with, that in Cleveland and shall be very glad for any correction in this sketch of the recent history of nitrous oxid and oxygen anesthesia. After all, the matter of priority is of little moment and might with propriety be dropped from the discussion of any scientific subject, but if it must be mentioned at all it should at least have the merit of accuracy.

Nitrous oxid and oxygen anesthesia does away with some of the disadvantages of ether. It is pleasant to inhale and leaves no terror in its wake. It annuls pain as certainly as does ether, post-anesthetic vomiting is nil if the gas is pure, although post-operative vomiting is still present in abdominal operations. On the authority of both Dr. Bevan and Dr. Crile, it does not lower the natural powers of the body to resist infection as does ether, but on this point I think we may suspend judgment. One thing seems certain, there is no such thing as nitrous oxid poisoning per se while there certainly is such a condition as ether poisoning. A nitrous oxid fatality I believe always to be a fatal asphyxia due to deprivation of oxygen and not a true poisoning at all.

Nitrous oxid does not irritate the mucosa of the respiratory organs, it causes no increase in the salivary secretions, it does not irritate the kidneys. Pneumonia, therefore, is not precipitated by its use, although pneumonia does occur after operations performed under nitrous oxid. It does not light up latent tubercular foci to renewed activity, and never causes nephritis and suppression of the urine.

Inasmuch as nitrous oxid can be given over a prolonged period without poisoning, it is the anesthetic of choice for operations which for any reason are likely to be very prolonged, such as extensive resection of the glands of the neck, and for multiple operations like plastic operations on the female genitalia followed by intra-abdominal operations at the same sitting. But even this innocuous anesthetic has its drawbacks. If painful stimuli are conveyed to the unconscious brain to cause shock, then as light an anesthesia as is produced by nitrous oxid should markedly predispose to shock. That it does not do so seems to me to be irrefutable evidence of the fallacy of this view. In fact, the storm around the question of whether the brain cells suffer from unfelt pain seems about as reasonable as the discussion of whether sound exists where there are sound waves but no auditory apparatus to record them. It does not matter whether we insist that sound waves are sound or their recognition. To us there is no sound unless we recognize it.

About other drawbacks there can scarcely be an argument. If pain causes shock, and recognized pain certainly does, then post-operative shock will come on after nitrous oxid anesthesia, because the awakening is so prompt after withdrawal of the anesthetic. To obviate this, as well as to follow the dictates of humanity, either a lasting local anesthetic must be used in the painful areas or else opiates must be given early and often after operations which in themselves are productive of severe after pain. The contrast between the appearance of a patient as he leaves the surgery after an appendectomy under nitrous oxid, for instance, and that patient an hour later is something startling unless morphin has been administered in liberal amounts.

Quinine and urea hydrochlorid is the only local anesthetic of which we have any knowledge that is sufficiently lasting to retain its effects for more than half an hour, and quinine and urea hydrochlorid positively and certainly interferes with wound healing in a fair percentage of the cases in which it is used. Neither cocain nor any of its derivatives or congenors lasts long enough to be of any use, and all of us know the reaction pain when the effect of these drugs wears away.

Personally, then, I prefer the opiate, one dose immediately preceding the anesthetic and another as soon as consciousness returns.

Muscular rigidity, however, is the chief drawback to nitrous oxid. This does not interfere in the least with a thyroidectomy, a cervical adenectomy, a perineal prostatectomy, a breast amputation, or the amputation of an extremity, but all of these combined do not equal the number of intra-abdominal operations which are performed in the course of a general surgical practice. In some abdominal operations nitrous oxid anesthesia offers an insuperable obstacle to the proper completion of manipulations. I believe I am quite within the truth in stating that cholecystectomy would be impossible of performance in an obese woman who had never borne any children, if nitrous oxid-oxygen were our only anesthetic agent. Nitrous oxid muscular rigidity is also responsible for protruding gut in every laparotomy upon patients not desperately ill, or in whom the abdominal wall is not greatly distended by a large tumor. It thus leads to more handling of gut and packing away with sponges than would be necessary otherwise, and to more bruising of wound edges than would be in the case with ether.

Not the least of the drawbacks of nitrous oxid and oxygen anesthesia is the utter impossibility of doing a satisfactory exploration of the entire abdomen unless a huge incision is made. At the present time surgery is undertaken fearlessly in a large number of instances in which the topical diagnosis is uncertain, or in which, a diagnosis having been made, it is proven erroneous when the suspected organ is exposed. I need only cite the confusion in the differential diagnosis as between gastric, gall bladder, and appendicular disease and the frequent association of all three. If the diagnosis of gastric ulcer, for example, is confirmed by a high median incision, the operator is only too likely to stop short and make no attempt to see or feel the appendix if the patient is under nitrous oxid.

The duration of an abdominal operation is longer under nitrous oxid than under ether, other things being equal, and there are instances, like some operations for ruptured ectopic pregnancy, in which a few minutes makes the difference between a recovery and a death.

It is said that nitrous oxid is easier on the patient but harder on the operator, but I wish to call attention to the fact that anything which causes undue fatigue on the part of the operator is also dangerous for the patient.

Nitrous oxid positively demands an expert anesthetist. The margin of safety seems to me to be narrower with gas than with chloroform, although resuscitation is easier. Be this as it may, if I had to undergo anesthesia myself at the hands of a tyro and only chloroform and nitrous oxid were available, I should choose chloroform.

I have been speaking of pure nitrous oxid and oxygen anesthesia, but the addition of a small percentage of ether changes the picture quite materially, and it is nitrous oxid-oxygen-ether which must be used if one is to work satisfactorily in the abdomen. Even with this combination the same drawbacks exist but in a minor degree. All the difficulties are not overcome unless ether is given freely enough to make the anesthetic to all intents and purposes an ether anesthetic. In other words, one must work against obstacles in abdominal operations if nitrous oxid predominates in the anesthetic mixture. It becomes, therefore, a matter of judgment to select the proper anesthetic for the patient, and strike a balance between the known advantages and disadvantages of both anesthetic agents.

I have avoided the question of local anesthesia because that is a question which does not interest the professional anesthetist, and I have also avoided any reference to spinal anesthesia for the same reason. Certain methods of anesthesia have been passed because they are peculiarly within the province of the anesthetist and their use contingent upon his training. I refer to rectal, intratracheal, and intrapharyngeal anesthesia under pressure. I should like, however, to devote a moment to combined local and general anesthesia in desperately ill patients. Used as a sequence, not simultaneously, it has enabled more than one patient on the verge of death to recover, and many others to be given a chance to fight for life, through the successful performance of an operation which could not have been conducted under general anesthesia alone. The operation proceeds as far as is comfortable for the patient under local anesthesia alone, and either nitrous oxid or ether is begun so soon as complaint is made of some discomfort, with the result that the patient takes but little of the general anesthetic. First, because he does not resist, and second, because the pain is far from unbearable. Ordinarily the major part of the operation is finished by the time the patient is fully asleep, and the wound is sutured before he is entirely awake. The merit in this procedure seems to me to be in minimizing the amount of general anesthetic required, and not in any shock inhibiting quality resident in the local anesthetic used.

To summarize: Any of the three most generally used inhalation anesthetics fulfills the first and prime essential of abolishing operative pain, but chloroform is dangerous enough to banish it from general consideration unless under exceptional circumstances.

Ether is many times the anesthetic of choice because of the simplicity of its administration, the wide margin of safety between ether anesthesia and ether death, and the perfect relaxation of the abdominal muscles, and in spite of the disagreeable odor and nasty after effects it must often be chosen.

Nitrous oxid is perfectly satisfactory so far as remote danger is concerned, but is far from safe at the time of its administration unless given by an expert. In ordinary operations upon the mouth, throat, neck, thorax, kidneys, bladder, cervix, and vagina, as well as operations upon the extremities, it is perhaps the anesthetic of choice. In multiple gynecological operations it presents great advantages, as it does in other operations bound from their nature to be protracted.

In most, but not all, abdominal operations it presents great disadvantages, some of which are lessened by the simultaneous use of a small percentage of ether, but none of which are entirely abolished unless ether is given with sufficient freedom to present most of the ether disadvantages.

After all, there is at present no one perfectly satisfactory, universally applicable, anesthetic or combination of anesthetics which fulfill all the essentials, and the only solution of the problem is for the surgeon and his anesthetist to be capable of good team work and adapt both the anesthetic agent and the method of its administration to the case in hand.

It remains the bounden duty of organizations such as this one to work out the problem, and it is for this reason that men with professional training must be encouraged to take up the study of anesthesia. An occasional nurse may acquire the knack of anesthesia and may by experience become a capable anesthetist, but she is fitted neither by education nor training to work out anesthetic problems. It is therefore the bounden duty of surgeons to encourage the professionally trained anesthetist to continue in that line by dignifying the position which the anesthetist holds, working with him on the problems involved, and seeing that his remuneration is sufficient to enable him to live on the fees which he obtains in his chosen line. In this way and this way only can the question of anesthetic essentials be settled and settled right.

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MAGNESIUM SULPHATE ANESTHESIA.[*]

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Our experiments with magnesium sulphate anesthesia have been limited to the lower animals. Three cats and thirteen dogs were used. Some of them were used for more than one experiment. Nineteen experiments were performed. Magnesium sulphate was used in steril solutions of M ^{1} and 25 per cent. strengths. They were injected subcutaneously, subcutaneously and intramuscularly, intramuscularly, intraspinally and intravenously.

The work of Meltzer, Auer and others was almost ignored, in order that impartial observations might be made. In experimental work it is necessary to find the toxic as well as the therapeutic dose. Such experiments are made only upon the lower animals.

Subcutaneous injections were used in four experiments. These solutions were 25 per cent $MgSO_4$.

Respirations were increased in all cases.

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[*] Read during the Organization Meeting of the Interstate Association of Anesthetists in Cincinnati, May 4, 5, 1915. From the B. Merrill Ricketts Experimental Surgical Research Laboratory

Dog, 9, weighed 45 pounds. The injections were made in the inner side of the right hind leg and corresponding inguinal region. This dog became sleepy; but was not anesthetized. Not much of the fluid was absorbed during the experiment.

Respiratory paralysis and death was produced in cat 4, and dog 7. A mortality of 50 per cent. They received 6cc. and 7cc. per pound of a 25 per cent. solution of $MgSO_4$.

TABLE 1.

Expr. No.	Weight	MgSO4 Sol.	Dosage per lb.	Respiration.	Antidote.	Result.	Anesthesia—Remarks.
				SUBCUTANEOUS INJECTIONS.			
Cat 4	5 lbs.	25%	6. cc.	Rapid paralysis	$CaCL_2$ 20.cc. $\frac{M}{8}$	Table death	Complete
Dog 5	20 lbs.	25%	3. 7cc.	70 16		Recovered	Partial.
Dog 9	45 lbs.	25%	3. 5cc.	18 before 27 after		Recovered	Incomplete Sleepy.
Dog 7	17 lbs.	25%	6. 7cc.	46 8 Paralysis		Table death	Complete.
				INTRAMUSCULAR INJECTION.			
Cat 1	4 lbs.	25%	3. 2cc.	Respiratory	10cc. 5%	Table death	Complete. Abdominal Sect.
Cat 2	5 lbs.	25%	2. 4cc.	46 180 160 66 22 16 Respiratory paralysis	16cc. 5%	Death from $CaCl_2$	Complete. No Section.
Dog 6	37 lbs.	25%	3. 5cc.	18 40 30 21		Recovered	Complete. Good, Conscious, Abdominal Sect.
Dog 8	14 lbs.	25%	3. 5cc.	Respiratory paralysis	30cc. $\frac{M}{8}$	Table death	Complete. No Section.
Dog 10	15 lbs.	25%	2. 1cc.	20 36		Recovered	Complete. ideal. Section. Able to walk from table.
Dog 11	28 lbs.	25%	3. 0cc.	57		Recovered	Partial.
				INTRAVENOUS INJECTIONS.			
Dog 12 (9)	45 lbs.		0.95cc.	24 30		Recovered	Complete. Conscious. Walked from table.
Dog 14 (10)	15 lbs.		0.91cc.	Respiratory paralysis		Table death	
Dog 15 (11)	28 lbs.		1.21cc.	40 42 20		Recovered	Complete. Conscious. Walked from table.
Dog 16	21 lbs.		1.31cc.	42		Recovered	Complete. Conscious. Walked from table.
Dog. 17	16 lbs.		1.01cc.	Respiratory paralysis Pulling abdominal muscles revived breathing. (Dr. Whilms.)	$CaCl_2$ 2.cc.	Recovered	Partial. Walked from table.
Dog 18	25 lbs.		0.72cc.	18 30		Recovered	Conscious to cutting, not manipulations. Walked from table.
				INTRASPINAL INJECTIONS.			
Dog 13	35 lbs.	$\frac{M}{1}$	3.28cc. per lb.	Respirations up to 90		Recovered	Complete. Conscious. Able to walk.
Dog 19	35 lbs.	M	1.14cc. per lb.	16 30 24 28 36 34 32		Recovered	Complete. Conscious. Not able walk.

The dogs which recovered received 3.7cc. and 3.5cc. of a 25 per cent. $MgSO_4$ solution.

Magnesium Sulphate was not found to be a local analgesic.

Anesthesia was produced in 75 per cent of the cases.

Gangrene developed in the two cases which recovered. In other words in 100 per cent. of the cases.

Intramuscular and subcutaneous injections were combined in one dog. Anesthesia was ideal. The dog was conscious but made no outcry of pain while opening his abdomen or palpitating the abdominal viscera. He flinched when the urinary bladder was palpiated; but did not seem to be in pain.

Respirations fell as low as 6.8. He was given 60 cc. of a 5 per cent. solution of calcium chlorid subcutaneous and intramuscularly. This revived him. Death occurred several hours after, presumably from calcium chlorid. Post mortem: leg edematous where calcium chlorid was injected.

Intramuscular and subcutaneous.

Dog 11. 21.5 pounds. $MgSO_4$ 25 per cent. 3.6 per pound. Respirations 6.8.

Calcium chlorid 60 cc. 5 per cent. Death. Anesthesia complete.

Intramuscular injections were used in six animals. Two died on the table. One of the deaths occurred in a cat and the other in a dog. The cat received 3.25 cc., while the dog received 3.501 cc. of a 25 per cent. $MgSO_4$ solution, per pound. This gives a table mortality of 33.3 per cent. Cat 2, received 1.4 cc. of a 25 per cent. $MgSO_4$ per pound. It had respiratory paralysis which was overcome by a 16 cc. of a 5 per cent. calcium chlorid solution. This cat died some hours after. Its death was attributed to calcium chlorid. Edema was present in the leg where calcium chlorid was injected.

TABLE 2.

Animals Recovering Without Respiratory Paralysis.

Experiment No.	$MgSO_4$ Sol.	Amount.	Time of Administration, Hours, Minutes.
		Subcutaneous Injection.	
Dog 5	25%	3.7cc.	One hour, 17¾ minutes.
Dog 9	25%	3.5cc.	17 minutes.
		Intramuscular Injections.	
Dog 6	25%	3.5cc.	11 minutes.
Dog 10	25%	2.1cc.	22 minutes.
Dog 11	$\frac{M}{1}$	3.9cc.	One hour, 14 minutes.
		Intraspinal Injections.	
Dog 13	$\frac{M}{1}$	3.22cc. Lumbar	32 minutes.
Dog 19	$\frac{M}{1}$	1.1cc dorsal	38 minutes.

TABLE 3.

Animals that Died or had Respiratory Paralysis.

Expr. No.	$MgSO_4$ Sol.	Amount.	Time of Administration.	Fatality.
		Subcutaneous Injections.		
Cat 4	25%	6. cc.	:12 mins.	Res. paralysis in 2 minutes.
Dog 7	25%	6.7cc.	1:26 mins.	Died 29 mins. after last dose.
		Intramuscular Injection.		
Cat 1	25%	3.2cc.	In one dose	Res. failure in 11 mins. Death.
Cat 11	25%	1.4cc.	In one dose	Res. failure in 32 mins.
Dog 8	25%	3.5cc.	3½ mins.	Died in 7½ mins.

Respiratory paralysis did not occur in 50 per cent. of the cases in this series. The animals which recovered, received 3.5 cc., 2.13 cc. and 3.014 cc. of a 25 per cent. $MgSO_4$ solution. Dog 10 received 2.13 cc. and dog 11, 3.01 cc. Anesthesia was ideal in the former and partial in the latter. These two experiments show how unreliable the dose is when used in the muscles.

Dog 10 had her abdominal wall opened to the peritoneum, no pain. She was conscious and able to walk when removed from the table.

Gangrene occurred in 66.6 per cent. of the cases which recovered.

Intraspinal injections were given upon two different occasions. An $\frac{M}{1}$ solution was used in each of the experiments. In one experiment 3.28 cc. per pound were used in the lumbar region, while in the other 1.14 cc. per pound were used in the dorsal region. In each experiment a large quantity of fluid escaped around the needle. More escaped, however, in the first than in the second experiment, which probably accounts for the difference in the dose.

Anesthesia was ideal in each experiment.

TABLE 4

Animals that Recovered Without Respiratory Paralysis.

Expr. No.	$MgSO_4$ Sol.	Amount.	Time of Administration.	Outcome.
		Intravenous Injections.		
Dog 12	$\frac{M}{1}$	.95	53 mins.	Recovered
Dog 15	$\frac{M}{1}$	1.21cc.	[illegible]5 mins.	Recovered
Dog 16	$\frac{M}{1}$	1.31cc	16 mins.	Recovered
Dog 18	$\frac{M}{1}$	.72cc.	33 mins.	Recovered

TABLE 5.

Animals that Died or had Respiratory Paralysis.

Expr. No.	$MgSO_4$ Sol.	Amount.	Time of Administration.	Fatality
		Intravenous Injection.		
Dog 14	$\frac{M}{1}$	.91cc. to lb.	1 min.	Res. paralysis in 1½ mins. after last dose.
Dog 18	$\frac{M}{1}$	1.01cc. to lb.	All but 2cc. in 9 mins. 2cc. at 19 minutes.	Res. paralysis in 10 mins. after last dose. Recovery.

Gangrene developed at the points where the fluid escaped in each experiment.

Intravenous introduction of $MgSO_4$ $\frac{M}{1}$ solutions, were used in six dogs. These solutions were injected into the jugular vein. Our ansepsis was not perfect in all of these cases and as a result there was some wound infection. In some cases the solution escaped from the vein into the tissues. There were no large sloughs as gangrene in this series. The mortality was 16.1 per cent.

Dog 14, which died, received the reasonable dose of .915 cc. per pound. The method of administration was faulty, since all of the solution was given within 1½ minutes. While the last dose was being given retching occurred. Respiratory paralysis resulted in 1½ minutes after the last dose was injected.

From our results it seems that $MgSO_4$ in $\frac{M}{1}$ solutions may probably be safely given, if none of the $MgSO_4$ escapes in the wound. If it does escape it should be washed out of the wound and the wound drained. The jugular veins were found to be obliterated when the dogs were killed.

Muscular relaxation occurs first in the abdominal muscle. In some cases the abdominal muscles were completely relaxed, while the animals were able to raise their heads.

It was noted in some instances that the abdominal muscles were but partially relaxed when anesthesia occurred. In an intravenous case the abdominal muscles were relaxed before the required dose was finished. Relaxation occurred in some animals within one to fourteen minutes after the last dose. It was impossible to make these observations in all the experiments.

In action $MgSO_4$ is very similar to ether or chloroform. There is an increase in respiration, excitement in a small per cent. of the cases, nausea, vomiting, reduction of respiration, anesthesia with consciousness in some cases, sleep with anesthesia and finally respiratory paralysis if the dose is large enough. Nausea and vomiting are toxic symptoms.

The accompanying tables contain the doses, time consumed in injecting the drug as well as other details and the results.

Observations from Our Experiments.

(1) Magnesium is toxic in large doses.

(2) That it will cause respiratory paralysis.

(3) That it will cause general anesthesia, although the animal is conscious.

(4) That it will cause sloughing, and gangrene in some cases, when introduced subcutaneously or intramuscularly. Or when it escapes into the muscles or connective tissue.

(5) That it is not a local anesthetic.

(6) That the toxic and therapeutic dose vary in different dogs.

(7) That the time required to inject is about 30 minutes.

(8) That when the dose is given in too short a time, respiratory paralysis or death may result.

(9) That the intravenous route is the best.

In closing, it must be remembered that our mortality is connected with experiments, and that in some cases the life of the dog was not considered.

Finally: I wish to thank Dr. J. H. Wilms for his kind assistance and suggestions while this work was in progress.

8 WEST 9TH STREET.

DISCUSSION.

DR. J. H. WHILMS, Cincinnati, O: The analgesia of the magnesium salts has been known for a long time and its specific effects on the neuron would occupy much time and theorizing to adequately discuss them. These experiments have brought to our attention very forcibly the disastrous effects of the subcutaneous use of magnesium sulphate in the production of gangrene. That it will produce anesthesia when injected subcutaneously, intramuscularly and intravenously, in varying amounts; that it has a definite toxic effect more or less uniformly simulating shock with nausea, vomiting and paralysis of respiration we think we have demonstrated. These effects can be controlled by a measured dose and also by a gradual administration only when given intravenously. Dr. DeNeen certainly deserves a great deal of credit for his persistence in these experiments as I was often discouraged at the results we obtained. However, magnesium sulphate may some day be used as an analgesic for operative work, as it produces a complete anesthesia and relaxation with consciousness—providing we are able to eliminate in some way its toxic effects.

EDEMA OF THE LARYNX DURING ANESTHESIA: A REPORT OF TWO CASES REQUIRING TRACHEOTOMY, WITH RECOVERY OF BOTH.*

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Two Cases Requiring Tracheotomy with Recovery of Both.

CASE 1.—Mr. H. B., Male, white, age 40, weight 190 lbs., height about 5 ft., 7 in., with a short thick neck and a great deal of swelling on the left side of the face and neck.

Present illness.—Infection around the teeth with general cellulitis of the left side of the face and neck.

Anesthetic.—This case occurred about eight years ago when I was an interne in the George Washington University Hospital. At that time chloroform was used in about 50 per cent. of the cases operated upon, so I was instructed to give him chloroform. The patient was not excited or nervous and did not object to taking the anesthetic. There was no apparent obstruction of breathing. Chloroform was started slowly by the drop method. There was no talking, holding of breath, coughing, struggling, or any difficulty in taking the anesthetic. In fact it did not seem possible for a person to take chloroform with any less trouble or difficulty than he was having.

I had been giving the chloroform about three or four minutes and the patient was starting in the second stage of chloroform anesthesia, without any excitement, when suddenly there occurred complete obstruction of the respiration. There were violent respiratory movements, but as there was no air entering the lungs he was deeply cyanosised in a few seconds. The anesthetic was stopped, the head lowered, the lower jaw was raised, traction was made on the tongue with a pair of forceps, and pressure was made on the chest, all without relieving the condition. When his trouble first started, I thought it was the usual excitement stage that we often have in the robust, and was only muscular spasms that would soon clear up with stopping the anesthetic. But finding that I could not get any air in the lungs by the usual methods, and that he was rapidly getting worse, Dr. W. P. Carr was called from the wash-up room. The patient was put on the operating table and Dr. Carr quickly did a tracheotomy. There was some difficulty in opening the trachea, so that by this time it was impossible to get the radial pulse, and respiratory effort had almost ceased, although we could get the heart beat over the apex region with ease. As soon as the trachea was opened there was a marked inhalation of air, and the respiration and pulse soon approached normal.

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* Read before the District Medical Society, Washington, D. C., May 19, 1915.

From the time the edema occurred until the trachea was opened was only about three minutes, and I feel quite sure that another minute or two in this case would have caused us to have had a fatal result. By the time the tracheotomy tube was fixed in place, the patient had reacted sufficiently, that in order to do the operation more anesthesia was needed. This was given by dropping the anesthetic on gauze placed over the tracheotomy tube. This also shows that the edema was not caused from an overdose of the chloroform, but rather by the irritation of the same.

On taking a post-operative history in this case he stated that about two years previous they had attempted to operate upon him for some infection about the teeth, under chloroform anesthesia, with the result that at that time they had to perform a tracheotomy to prevent a fatal result. The scar tissue from the first tracheotomy explains why Dr. Carr had difficulty in opening the trachea at this time.

Case 2.—Mr. M. N., Male, white, age 42, well developed, weight 185 lbs. Gave a history of three previous attacks of peritonsillar abscess. He came to the dispensary of the George Washington University Hospital with the 4th attack, where Dr. E. Y. Seibert made an attempt to open the abscess, but had to give it up because of the marked rigidity of the jaws. The jaws were so firmly fixed that it was impossible to get a tongue depressor between them in such a manner as to depress the tongue enough to expose the abscess.

Dr. Seibert decided he would need a general anesthetic to relax the jaws sufficiently to open the abscess. So he sent him to the ward, and requested his assistant, Dr. Tibbits, to open the abscess under a general anesthetic. Before the anesthesia was started there seemed to be very little interference with breathing.

I began with ether by the open method and had no trouble until he entered the second or excitement stage of anesthesia Then there was struggling, coughing, holding of the breath, and some cyanosis, but on stopping the ether for a few minutes he would clear up. A number of attempts were made to get him under the anesthetic long enough to relax the jaws, but each time he would become cyanosed. On stopping the ether the last time the cyanosis failed to clear up. Respiratory effort was about normal, pulse 96, and as the jaws were still rigid it was impossible to open the mouth to make traction on the tongue or raise the lower jaw.

Obstruction was not complete as in the other case, but he was not getting enough oxygen and his cyanosis was getting worse. His head was lowered and turned in various positions trying to remove the obstruction, pressure was made on the chest, and I tried to force oxygen in the lungs with the pulmotor, but could not see that it was of any aid. After several minutes the jaws relaxed apparently from the deep cyanosis. Then the tongue was pulled well out, the lower jaw was raised, and with a spongue on a holder his mouth and throat were freed of mucous, but this still did not relieve the obstruction. His pulse was now 115 per minute, so I suggested to Dr. Tibbits that he cut down on the trachea and be ready to do a tracheotomy in case we could not remove the obstruction. We again tried the pulmotor, but with no good results. The pulse was now about 140 per minute and the respiratory effect was getting weaker, so that I did not feel justified in trying anything else. So Dr. Tibbitts now finished his tracheotomy and the patient's color, respiration and pulse gradually returned to normal. The abscess was now opened and the patient sent back to the ward. By this time he had completely reacted. In this case from the time the ether was stopped until the trachea was opened was about 10 to 12 minutes.

When the above condition occurs during anesthesia there are a number of conditions that it might seem to be that you have to consider. First the *muscular spasm* which frequently occurs during the second stage of anesthesia, but usually clears up by stopping the anesthetic for a short time. Other conditions are spasm of the glottis, bulging of the abscess sack or relax tissue into the larynx or trachea, rupturing of a peritonsillar abscess, or an undiscovered deep seated abscess, or the aspiration of food, pus, or mucus into the trachea.

I wish to quote a few extracts to bear out my previous statements.

Gwathemey states: "Muscular spasms are prone to characterize the ordinary administration of chloroform, this tendency being greater the more vigorous is the muscular development of the subject. The muscles of the extremities, abdomen, chest, *larynx, neck* and *jaws* are particularly apt to be involved in tonic spasms during the earlier stages of the anesthesia." With regard to nitrous oxid anesthesia, he states further: "The author knows of one case in which a fatality occurred when nitrous oxid oxygen anesthesia was given for the extraction of a tooth, and an undetected abscess at the base of the tongue burst at the height of anesthesia and immediately filled the patient's lungs with pus, the patient dying within three minutes." (*Anesthesia—Gwathmey*, p. 303 and 330.)

In discussing surgery of the larynx, Keen says: "In many cases of edema from severe tramma, erysipelas, of Ludwig's angina, the development of the symptoms is so rapid that death may ensue before a surgeon can be summoned. Lennox Brown reported an instance where a man suddenly developed an edema while sitting in the waiting room of a public dispensary where he had gone for treatment of another disease. In this case death occurred in a few minutes before the attending staff could perform tracheotomy." He states under prognosis: "The prognosis in conditions complicated by the edema of the larynx is always grave." Under treatment he states: "In all cases, however, in which the life of the individual is threatened, no time should be wasted by a trial of milder methods as tracheotomy is positively indicated as the only rational treatment." (Keen's Surgery, Vol. iii., p. 480.)

Bishop in referring to the same subject, writes: "Occasional deaths have occurred from tonsillar abscess emptying into the larynx or causing laryngeal edema." (*Diseases of the Nose, Throat and Ear—Bishop*, p. 201.)

The two cases reported above bring to mind some things of importance that are often neglected. (1) We should have a complete history in all cases. With a history in the first case, we more than likely would have used ether instead of chloroform, although the result probably would have been the same. (2) I think we often underestimate the danger of infections of the mouth and throat. (3) The importance of operating in such cases in a hospital, where we are prepared for all emergencies, rather than at home, where they would cause a panic and possibly prevent a good result. (4) The rapidity with which fatal laryngeal edema can occur without any warning previously.

606 SIXTH STREET.

ON THE RATE OF EVAPORATION OF ETHER FROM OILS AND ITS APPLICATION IN ETHER-OIL COLONIC ANESTHESIA.[*]

CHARLES BASKERVILLE, PH. D., F.C.S.,
Professor of Chemistry and Director of the Laboratory,
College of the City of New York.
NEW YORK CITY.

It is conceded that the anesthetic agent must get into the blood for distribution and for eventual elimination, whatever theory of general or central anesthesia one may support. The anesthetic agent has normally been introduced into the blood by inhalation or intravenously. It is normally eliminated via the lungs.

The intestinal mucous membrane of vertebrates is well known as an efficient transmitter of gases to and from the blood. Pirogoff[1] appears to have been the first to mention the administration of ether by this route. Liquid ether was used until Magendie gave warning as to the danger of its use and ether vapor was substituted. During the same year Roux,[2] y'Yhedo[3] and Duprey[4] employed liquid ether or aqueous mixtures to induce complete anesthesia. Although Pirogoff's enthusiasm prompted him to predict the supplanting of the inhalation procedure by the rectal method, references to it disappeared from the literature until 1884. Then Molliere[5] revived interest in the method by using a hand bellows for forcing the ether vapor into the intestine. Variations in the technic were introduced during the same year, but the experiences of Yversen, Harter, Bull,[6] Weir,[7] Wancher[8] and Post[9] showed more or less diarrhoea and melena as after-effects. These after-effects, with one case of death directly attributable to the procedure, caused the method to again fail in securing serious recognition until 1903, when Cunningham[10] employed air as a vehicle for sweeping the ether vapor into the colon. In 1909 Lueguen, Money and Verliac[11] used oxygen as the vehicle for the ether vapor. Buxton[12] in his splendid book on *"Anesthesia"* says that he found the procedure most satisfactory for certain operations, for example, those having to do with the mouth, nose, etc., but he remarks *"Deaths have occurred."* Sutton's[13] introduction of a return flow tube for these gases introduced and unabsorbed constituted a distinct advance in anesthesia by colonic absorption.

In an effort to avoid certain well known difficulties in intravenous anesthesia, Gwathmey experimented with mixtures of normal saline solution and ether per rectum. The concentration of ether in the aqueous solution was so small that excessive volumes of liquid were needed, and furthermore the ether parted from the solution so very rapidly that experimentation along those lines was abandoned. Gwathmey then applied a solution of ether in olive oil. As oil and ether make perfect solutions in all mixtures, it was his hope to reduce the total bulk of the fluid introduced into the colon by using a stronger solution of ether in oil than is possible with any known aqueous mixture. As oils are lubricants it was also hoped to avoid the irritation of the mucous membrane previously noted. The ether may always be separated from the oil by warming, but unless the temperature of the mixtures is suddenly raised to an excessively high point, the ether passes off deliberately. It was thought that the evaporation of the ether would induce some cooling of the mixture with a consequent checking of the evaporation and its absorption. These premises coupled with slow absorption by the colon in comparison with the rapid elimination by the lungs would automatically regulate any anesthesia that might be induced in this manner. As a result, Gwathmey presented a paper before the 17th International Medical Congress in London in 1913 on the work with animals done by himself and Wallace.

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[*] Read before the American Philosophical Society, Philadelphia, April 23, 1915; the New York Section of the American Chemical Society, June 11, 1915, and the American Association of Anesthetists, San Francisco, June 21, 1915.

At the request of my co laborer, Gwathmey, I undertook an investigation on the rate of evaporation of ether from oils to secure the following information that might be of service to him in his further application of his ideas with human subjects:

1. A comparison of the rate of evaporation of ether from different mixtures of ether and the same oil;

2. A comparison of the rate of evaporation of ether from the same per cent. mixtures of different oils and ether; and

3. The influence of surface on the rate of evaporation was determined.

As the result of much preliminary experimentation, the following mode of procedure was settled upon. Large glass tubes were calibrated to 1 cc. from 20 cc. to 105 cc. The mixtures of 25, 50 and 75 per cent. of oil and ether were carefully

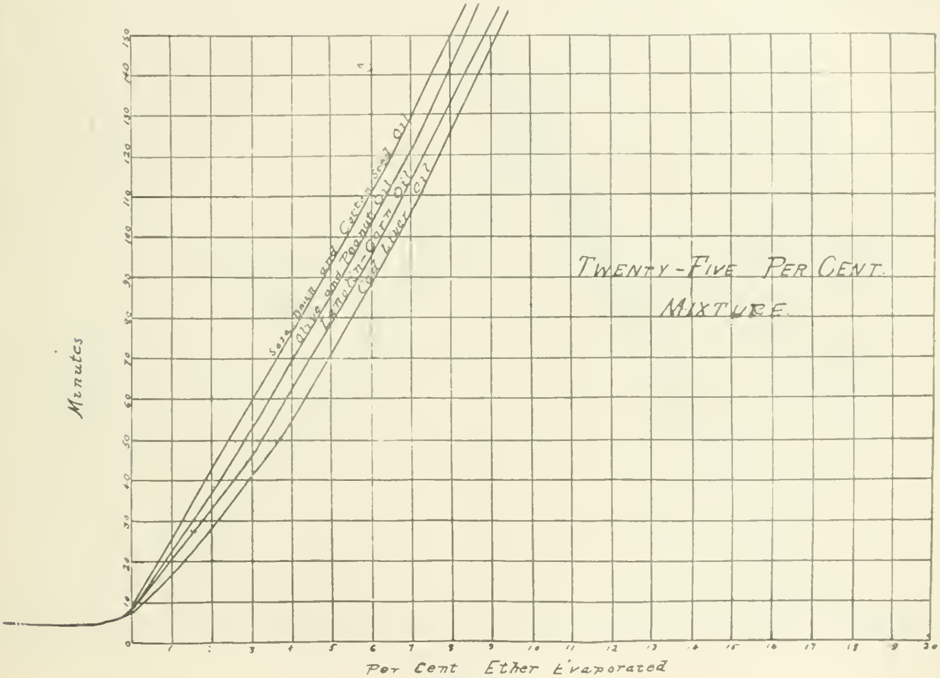

CHART I.

placed in the tubes. The tubes were weighted with lead and placed in a thermostat, whose temperature was so regulated as not to vary more than 0.03° C. from 37° C., the same being controlled by a toluene-mercury temperature regulator. All connections (gas, water, etc.) were made with lead pipe for safe use over night, as occasion arose. The water in the bath was stirred by a system of paddles and shaft operated through belt and pulleys by a small hot air engine. The tubes were immersed in the bath to within 2 cm. of the tops. During the first five minutes two readings were made in each case to get the highest point to which the volumes expanded upon heating up to 37° C. After that readings were made every five minutes for two or three hours.

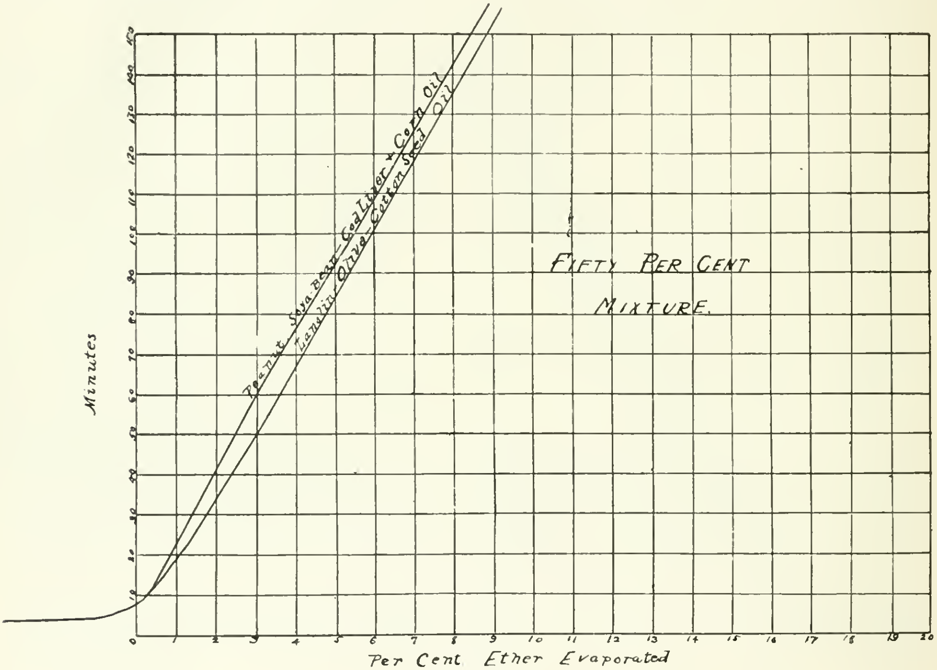

CHART II.

Since the evaporation of any liquid depends upon the partial pressure of that liquid at its surface, the higher the glass wall above the surface of the oil-ether mixture, the heavier the column of ether vapor resting on the surface of the mixture, the slower will be the evaporation, consequently the different oil mixtures with the different percentages of ether were experimented with in the same tube filled to the same height in each experiment.

In the experiments to determine the influence extent of surface played upon the rate of evaporation, the same precautions were taken as to height of walls of the containing vessels. In the largest areas worked with, this involved using as much as 600 cc. of the mixture. As the 75 per cent. mixture has been found most satisfactory clinically, this was determined with that mixture only.

The ether used was that prepared under my supervision and was 97 per cent. absolute with 3 per cent. absolute alcohol, being free from acids, aldehydes, and water.

The oils used were of three types, vegetable, animal and mineral, being respectively, olive, cotton seed, corn, peanut and soya-bean; cod-liver and lanolin (anhydrous), and Russian mineral oil. All the vegetable oils, except olive, were refined by a process devised by the author[14] and were neutral. The other oils were purchased in the open market.

The experimental work was carried out by Mr. Hyman Storch, under my direction.

The data obtained for the 25, 50 and 75 per cent. mixtures vegetable and animal oils are shown graphically in Charts I., II., and III. below. In the curves the abscissae show the percentage of ether evaporated (based on volume measurements) and the ordinates time of the evaporation.

Chart IV. (selected at random from charts made for each oil) shows the difference in rate of evaporation 25, 50, and 75 per cent. mixtures with one oil.

Chart V. shows the effect of increased surface on the rate of evaporation. One oil only was selected to show the principle which is, the rate of evaporation bears a direct ratio to the surface exposed.

These experiments were made in glass, hence they do not disclose all the factors in the conduct of such mixtures in contact with the walls of the colon, for there the principles of osmosis and diffusion are involved. But these observations demonstrated several striking facts:

1. While ether boils at 34.6° C., it does not escape violently from an oil-ether mixture, as from an aqueous mixture when the mixture is heated higher, namely, to the body temperature of 37° C.

2. The *rate* of separation of ether from the oil quickly acquires a definite and fairly fixed speed.

The significance of this conduct cannot fail to be of great importance, for by this means the proper content of ether may be maintained in the blood to produce any desired physiological effect that has a quantitative relation thereto, for example, the third or surgical stage of anesthesia.*

The last mentioned has been demonstrated clinically by Wallace, who found respiration and blood pressure fully maintained, and Gwathmey and others with records to date of about 1,000 human cases. So far, not a case of post-ether pneumonia has been encountered. The after-effects usually associated with inhalation anesthesia, unless induced by the most improved modern technique, are virtually absent, including post-anesthetic nausea. Its use for special cases involving the head, breathing passages, etc., is superior. Although having had the privilege of attending clinics, I am not qualified to pass judgment upon its value, but from what I have learned, if necessary, "Give it to me that way."

College of the City of New York.

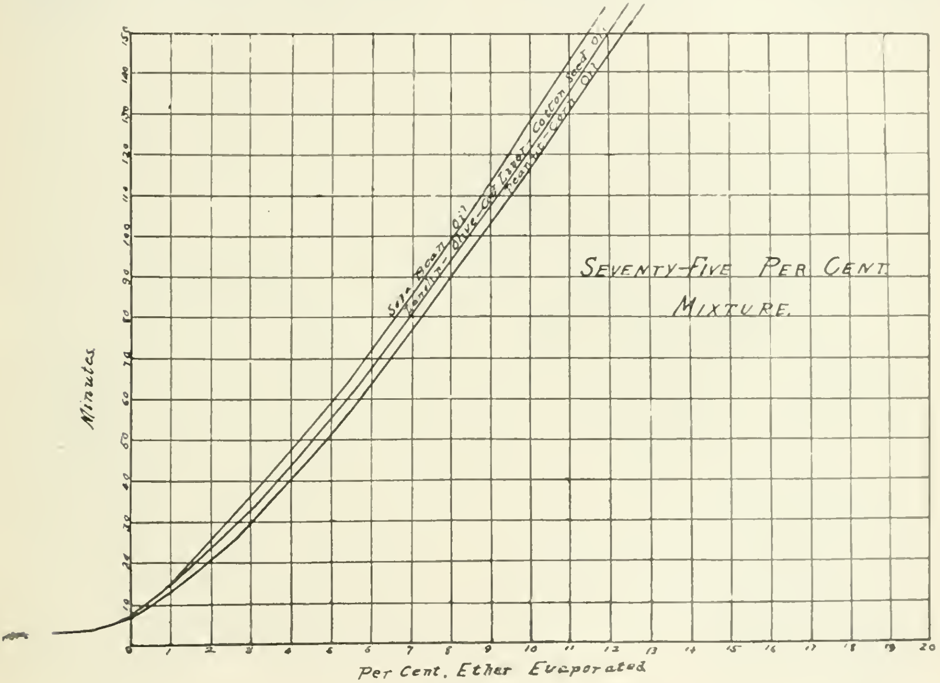

CHART III.

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* In this connection it may be stated that about 3[illegible] minims of a 75 per cent mixture to 20 lbs. of body weight is administered as an enema

DISCUSSION.

Dr. James T. Gwathmey, New York City: This is a method of anesthesia that has been very little used up to the present time, and rightly so, because in dealing with a matter of life and death we cannot be too careful or conservative. There are two factors it seems to me that have retarded its use more than anything else, and one is the fact that we put in the total amount of anesthetic at one time. This seemed to be necessary up to this time; otherwise we could not get an exact ether tension in the blood. But as you will notice by some charts that have been handed around, the ether evaporates from the oil continuously and not intermittently or irregularly. If all the ether that was placed in the rectum was evaporated at one time we would have ether anesthesia, shock and gradual recovery. But we do not have this. We have ether anesthesia, but produced and maintained in a perfectly even degree, maintained as evidenced by the results on the blood pressure, the color and other reflexes. The fact that the oil-ether mixture is in the rectum is not against this method, if you understand the accompanying charts. From these you can readily understand that the oil-ether mixture is practically outside the body. It is outside of the circulation, and it is as well out of the circulation as if it were on the outside of the body. It goes into the circulation very gradually. As the ether evaporates it cools off the mixture in the colon.

Another factor is the difference between the absorptive surface of the colon and the excretory surface of the lungs. These two things seem to maintain the anesthesia at the same level. As a professional anesthetist I am more and more convinced of the value of this method. There was a case that came to me about a week or ten days ago that will illustrate this more fully than anything else I could say on the subject. A boy seven years old, who weighed forty-three pounds, and was an only child. He was suffering from enlarged tonsils which interfered with his breathing in such a way that he could not get the proper amount of oxygen. They attempted to build him up before operating, but the child was gradually losing. His lips were blue at all times, a blowing systolic murmur being easily diagnosed, and the question of giving him any kind of anesthetic was a serious one. On consultation I told them that nitrous oxid oxygen was absolutely contraindicated in that case, for the reason that the child was already cyanosed, and to maintain anesthesia in that condition with nitrous oxid and oxygen, that the point between anesthesia and toxicity would be lessened to such an extent that it would place the child's life in danger, and the best method was rectal anesthesia, because it would do away with struggling and we could regulate and control it better. The child was brought into the city and placed in a private sanitarium. I told the nurse exactly the amount to give, and it was given, without the child seeing me or any other doctor; he did not know he was to be operated upon. He was used to getting nourishing enemas and thought nothing of that. As the child became insensible I came in and took charge of the case, and increased the depth of the anesthesia by one or two drops of ether; he was operated upon successfully and returned to bed I siphoned the amount not used by massaging the colon from right to left, with a large rectal tube in position. He came out of the anesthetic fifteen minutes after his return to bed, and he does not know now that he was operated upon; he thinks he "had a nose bleed" as he calls it. He left the sanitarium a few days later for his home.

The cases that are especially indicated for the ether-oil method are the very obese, men or women weighing from 200 to 300 pounds and over. In such cases, on account of narrowed air passages, we always have trouble in maintaining inhalation anesthesia, but with the ether-oil they behave beautifully. This is on account of the fact that they go under quietly and easily, if the patient is otherwise normal. The danger in giving this the first time might be that you would think the patient was not anesthetized, because all of the reflexes are very active, but at the same time if an incision is made the patient does not move. If you attempt to push the anesthetic and get the patient into the same stage of anesthesia you are accustomed to in inhalation methods you would have the patient in the danger zone. I used between one and a half and two ounces of a fifty per cent mixture in the boy's case, and he was about twenty minutes going to sleep. It takes a longer time when you use lower than the seventy-five per cent. It may be possible I could have done it with twenty-five per cent, but I always use fifty per cent in children. If you use a higher per cent you may not get any unpleasant symptoms, at the same time I prefer having the patient go to sleep quietly. This boy was an only child and the possibility was there would not be any more children in that family, and a great deal depended upon this surgical operation. With children, this method has not been as thoroughly worked out as with adults, and the only reason we fail, or have trouble, is because we do not get the colon entirely clean.

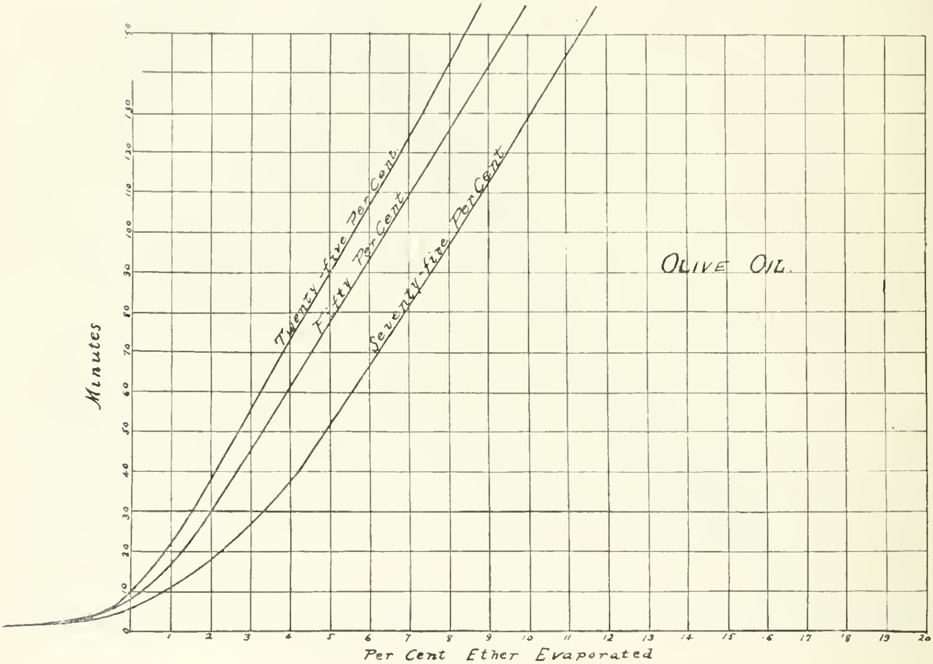

CHART IV.

Dr. Mary E. Botsford, San Francisco: I should like to ask Doctor Gwathmey if there is any means of increasing the depth of the anesthesia without using the inhalation method. And also if the reflexes are not completely abolished if it is possible to give it for tonsilectomies, say with a vigorous subject?

Dr. F. D. Bullard, Los Angeles: I have used quite a number of years ago ether by the vapor method by the rectum for operations on the throat, and I shall be very glad to take up this oil method, because I can see where it will be superior to anything else. I am very much pleased indeed with the paper.

Dr. Kate B. Van Orden, Alemeda: I would like to ask if you have complaints of any pain from the cold of the ether.

Dr. James T. Gwathmey (closing): The first case I used it on was an adenoid and tonsil case. We gave the ether-oil at 11 A.M., and the child left the hospital at 3 P.M. For an adult I would give a quarter of a grain of morphine, and a ten-grain chloretone suppository an hour before the ether-oil mixture. Just lately Dr. Wallace and myself have been working to reduce the amount of ether given by any method one-half. We find we can do it by using bromide of potash, two grams, paraldehyde two grams, morphia sulph. ¼ gr., in four ounces of water, per rectum. When this preliminary is used we give only one-half the ether-oil mixture heretofore used. Where we would ordinarily use eight ounces we reduce the amount to four ounces. In other words, instead of one ounce for every 20 pounds of body weight we now give one ounce for every 40 pounds.

In regard to pain, that varies absolutely with the patient. If the preliminary medication that I have mentioned is given there is practically no pain. In a majority of cases the patient goes to sleep very quietly and easily and the only danger is that we may attempt to increase the depth of anesthesia by inhalation methods until there would be stertor, which would be very dangerous. Even in very obese patients as a rule the breathing is quiet. The only thing I have been disappointed in in this ether-oil method is that it requires as careful attention as any other method. I was in hopes it would be so simple and easy that it could be used generally without a great deal of attention, but an open air way must be maintained at all times. To increase it after the amount predetermined upon has been given, you can still give one ounce more without getting into the danger zone. You have a danger sign when you have stertor or loss of lid reflex. As long as the patient breathes quietly, with the lid reflex present, and the pulse and respiration normal, the patient is in safe anesthesia.

In regard to cold vapor, that involves a physiological question that it would take a good while to discuss and—unless you had thought of it previously—to appreciate. It is a very strange thing that in spite of the fact that the colon is cold, the temperature of the patient remains the same and the color is always good, showing that oxidization is present. With the oil-ether anesthesia the patient always inhales a somewhat warm moist ether vapor, because after the ether has been taken up by the greater circulation, and carried through the liver, and excrated by the lungs, when again inhaled it is warm and moist.

The final test of the method is the clinical test, and the fact that we have given it in over 1000 cases without showing any toxic symptoms is amply sufficient.

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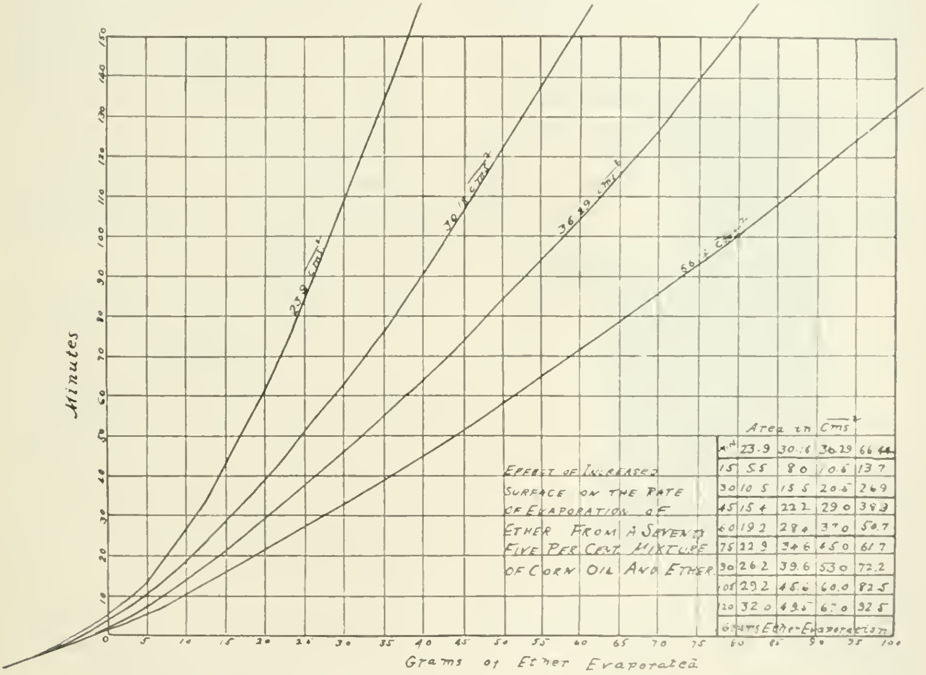

Area in Cms²

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15	5.5	8.0	10.5	13.7
30	10.5	15.5	20.5	26.9
45	15.4	22.2	29.0	38.3
60	19.2	28.4	37.0	50.7
75	22.9	34.6	45.0	61.7
90	26.2	39.6	53.0	72.2
105	29.2	45.6	60.0	82.5
120	32.0	49.5	67.0	92.5

Grams Ether Evaporation

CHART V.

FEATURES IN THE APRIL SUPPLEMENT.

PERSONAL EXPERIENCES WITH ANOCI-ASSOCIATION.
Wallace Irving Terry, M.D.,
San Francisco, Cal.

NITROUS OXID-OXYGEN ANESTHESIA.
Mary E. Botsford, M.D.,
San Francisco, Cal.

INTRAVENOUS ANESTHESIA.
C. L. Candler, M.D.,
Detroit, Mich.

American Journal of Surgery

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Cincinnati, Ohio, U.S.A.

JANUARY EDITORIALS. 1916

ADVANCING THE CAUSE OF ANESTHESIA AND PROMOTING THE INTERESTS OF ANESTHETISTS.

The SUPPLEMENT is now in a position to report progress all along the line in promoting the interests of anesthetists and advancing the cause of anesthesia.

Through the influence of THE INTERSTATE ASSOCIATION OF ANESTHETISTS, the States of Ohio and Georgia have announced through their Medical Boards that hereafter the administration of anesthetics by unlicensed anesthetists will be considered a violation of the existing Medical Practice Acts, and will be prosecuted as such. Also physicians, surgeons and hospitals persisting in the employment of unlicensed anesthetists will be disciplined by these Boards. An exhaustive canvass is being made in these states to secure evidence of violations of the law upon which the State Boards can take actions.

The Pennsylvania State Medical Board is going a step further and its action contemplates putting an end to the employment of unlicensed medical graduates as assistants in operative procedures. This will necessitate graduates securing their license to practice before taking up their interneships, and will end the abuse of the nurse-anesthetist, automatically.

At its November meeting the NEW YORK SOCIETY OF ANESTHETISTS decided to issue the following circular letter in behalf of a legislative campaign it is initiating to limit the administration of anesthetics to licensed practitioners.

> "To the Medical Society of the County of——,
> of the State of New York,
>
> At the next session of the New York Legislature, there will be introduced a bill to amend the Public Health Law, Article 8, Section 160, Paragraph 7, by adding the words: *'or shall administer a general anesthetic,'* so that said Paragraph 7, when amended shall read: 'A person practices medicine within the meaning of this article, except as hereinafter stated, who holds himself out as being able to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition, and who shall either offer or undertake, by any means or method to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition, or *who shall administer a general anesthetic.*'"
>
> "The New York Society of Anesthetists believes that this proposed amendment is just, both to the profession and to the public, and urges the Medical Society of the County of ———— to give it its official endorsement.
>
> Respectfully submitted,
> NEW YORK SOCIETY OF ANESTHETISTS,
> H. Clifton Luke, M.D., Sec'y."

This legislative campaign is worthy of the united support of the medical and dental professions of the State of New York.

The NEW YORK SOCIETY OF ANESTHETIST also took a progressive step at its recent meeting to increase its membership, especially by admitting dentists, who are active in the interests of anesthesia, to Associate Membership.—F. H. M.

SOME HISTORIC DATA REGARDING NITROUS OXID-OXYGEN ANESTHESIA.

As Dr. Roland E. Skeel in his recent paper before the New York Society of Anesthetists requested some additional information regarding the historical development of nitrous oxid-oxygen anesthesia, the following facts are submitted, without any desire to detract from the pioneer work of Dr. Ernest E. Brown or Dr. Charles K. Teter, and the efforts of the Lakeside Hospital surgical clinic to establish this technic of anesthesia as a routine method.

It has been generally overlooked that Horace Wells and his associates Drs. Ellsworth, Marcy and Evans, after using both ether and nitrous oxid for major surgical operations, discarded the former as the anesthetic of choice in favor of the latter, and used it in such procedures as amputations of the breast and scrotum. So popular did nitrous oxid become, at this time, that its use for painless tooth extractions was advertised in the Hartford Courant.

The progressive step of Dr. E. A. Andrews, in 1868, of combining oxygen with nitrous oxid, did not receive the attention it deserved until in 1879, after experiments by Paul Bert, M. Claude Martin of Lyons, France, built a chamber for the administration of nitrous oxid and oxygen, under pressure, and he and M. Labbe and M. Pean performed major operations under entirely satisfactory anesthesia maintained by 88 per cent. nitrous oxid and

12 per cent oxygen under an atmospheric pressure of 110 cm.

The first successful attempt to administer nitrous oxid and oxygen at ordinary atmospheric pressure by means of an apparatus capable of regulating the proportions of the two gases, was made by Hillischer of Vienna, and it was the report of his work that directed Sir Frederick Hewitt's inventive genius to the solution of the problems involved. After exhaustive experiments at the Dental Hospital of London, Hewitt presented a report on the subject to the Odontological Society, in 1892, and exhibited his perfected apparatus.

Although Hewitt developed this technic and his apparatus primarily for dental anesthesia, he soon adapted it to longer surgical operations, and reported its use in such procedures as Syme's amputation, lithotrity, amputation of the breast, excision of vericose veins, varicocele, ossilectomy, resection of the patella, intra-uterine operations, and *the dressing of wounds and readjustment of splints.* His longest administration lasted 52 minutes, although in March, 1902, an administration of nitrous oxid-oxygen anesthesia lasting 135 minutes was reported to the London Society of Anesthetists. Hewitt not only perfected an apparatus for the administration of nitrous oxid-oxygen in variable percentages, but also investigated the physiological basis of this form of anesthesia, and its relations to both operative procedures and types of patients.

From 1860-90 operations of varying duration were reported by different observers under nitrous oxid and air. The first systematic endeavor to formulate this technic was made by Dr. George Brush of Brooklyn, who in 1890 perfected an apparatus with a sliding valve, and maintained anesthesia with nitrous oxid and air for operations lasting upwards of an hour.

Clover and Coleman devised and used a nosepiece for the prolonged administration of nitrous oxid for dental operations, and later Coxon (1898) used the mouth-spoon, while Harvey Hilliard in 1902 introduced naso-pharyngeal tubes for the administration of prolonged nitrous oxid anesthesia. Coleman and Patterson revived the nasal inhaler in 1898-99, and in 1902 Kirkpatrick introduced the controllable expiratory valve, for the nasal administration of nitrous oxid and oxygen.

Since these preliminary investigations improvements have followed closely upon each other, and the anesthetists of the United States and their surgical confrères have vied with each other in perfecting this method of anesthesia, which in expert hands is so safe and pleasant for the patient.—F. H. M.

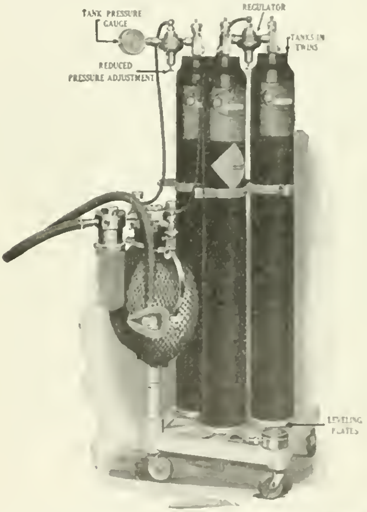
Newer Apparatus

Editor's Note: From time to time this Department will publish Illustrations and Technical Details of the Newer Apparatus for Anesthesia and Analgesia.

THE NEW McKESSON HOSPITAL UNIT FOR NITROUS OXID-OXYGEN AND ETHER ANESTHESIA

The new McKesson Hospital Unit for nitrous oxid-oxygen and ether anesthesia presents some improvements in mechanism that enable the expert anesthetist to more accurately manipulate and gauge his anesthesia. The large tanks with their pressure gauges and automats for controlling the flow to the apparatus, mounted on a movable base, are already familiar to readers of the Supplement.

The apparatus itself consists of two automatic pressure gauges, controlling the flow of nitrous oxid and oxygen to the mixing valve-chamber, which in turn controls the percentage mixture of the gases delivered to the patient. This part of the mechanism is now supplemented by a screw for increasing or decreasing the pressure of the gases without changing the percentages of the mixture. This pressure screw controls the automats attached to the rubber-bag containers for the nitrous oxid and oxygen, and effectively regulates the inflation and deflation of these bags.



From the mixing chamber the anesthetic gases pass into the tube connected to the mask, nasal inhaler, or mouth spoon or oral inhaler. A valve is provided, however, to throw into action the fractional rebreathing bag, by means of which fractional rebreathing can not only be used, but an economic saving of the anesthetic gases accomplished. Attached to the rebreathing bag is the ether container, by means of the regulating device of which the anesthetist can add any required percentage strength of ether vapor to the nitrous oxid-oxygen anesthesia to produce the proper degree of muscular relaxation.

An emergency oxygen valve is provided for perflation of the lungs in emergencies, although McKesson has repeatedly shown that in resuscitation, oxygen by fractional rebreathing to conserve the carbon dioxid tension, for stimulating respiration and venous tone, is the better procedure.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

In pursuance of its policy of *service* the SUPPLEMENT presents abstracts of the following papers of interest to medical and dental anesthetists, and recently read before various societies.

GENERAL ANESTHESIA VERSUS LOCAL IN NOSE AND THROAT SURGERY.*

JOSEPH C. BECK, M.D.,
Chicago, Ills.

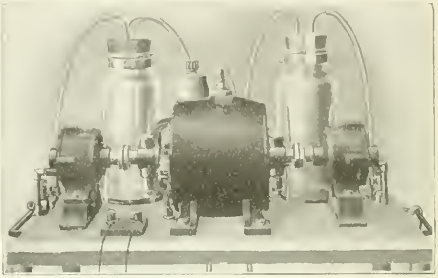
Dr. Joseph C. Beck first considered local anesthesia, referring especially to the work of Kohler with cocain. Owing to the possibilities of cocain poisoning there was a demand for substitutes, of which tropo-cocain, alypin, eucain, beta-eucain, novocain, stovain, quinin and urea hydrochlorate are some of the most important that have been recommended. In addition, it was found that local applications of solutions of adrenal gland extracts aided the anesthetic effect, as well as prevented rapid absorption of the poison. Up to the time novocain was brought forth as a local anesthetic it had been the speaker's experience that none of the above mentioned substitutes did the work as well as cocain, and even now he finds that in some cases he has to resort to it in order to get anesthetic effects. He only remembers one distinct case of cocain poisoning in a boy nine years old, followed by perfect recovery.

The speaker's experience with spinal anesthesia by means of stovain, as advocated by Jonnesco, had not been satisfactory.

Under general anesthesia he considered ether, chloroform, nitrous oxid, alcohol, chloroform and ether (A. C. E. mixture), bromid of ethyl, chlorid of ethyl, somnoform, morphin, scopolamin and hyoscin. From 1895 to 1901 it was his custom to employ chlorofrm as the general anesthetic in preference to ether, and he could say unhesitatingly that the results were much more satisfactory, as he never had a death from its use, and did have one death from ether. Nevertheless, following the general cry against chlorofrm, he gave up its use, only employing it in rare instances. He uses it almost exclusively in infants, especially in cleft palate operations. The anesthetic that he employs is ether, and he gave the method of its use in nasal, mouth and throat operations.

Dr. Beck wished to call attention to one of the most important question as to the choice of a local or general anesthetic. He referred to the work of Crile on the effect of mental shock or fear on the repair of the tissues after operation, and on the deleterious effect of this mental shock and fear on the nervous system. He is sure that every operator has observed what is termed postoperative neurosis, which is analogous to the posttraumatic or postpartum neurosis. He did not wish to say that one never sees the postoperative neurosis in general anesthetic cases, but certainly they are not nearly so frequent. He believes that if one would follow the teaching of Crile in applying the method of anoci-association, by blocking off locally the nerves by injecting novocain solution, one would see fewer of these cases following the use of general anesthesia.

Another important point in the choice of a local or general anesthetic is the question of pain that is experienced even in a thorough local anesthetic. Pain is a relative phenomena, and different individuals are more or less susceptible to it. A still more important factor is the ability to do thorough removal of the pathologic processes and the proper stopping of bleeding and application of dressing, which often is not possible in a very nervous patient. A fourth reason for the use of general anesthesia in preference to local is the strain on the operator when working under local anesthesia. The one great advantage in the local anesthetic is the saving of time both for operator and patient, but Dr. Beck doubts very much whether this factor can be taken into consideration after having stated the advantages of the general anesthetic. (Dr. Beck demonstrated the accompanying apparatus which he uses for general anesthesia.)



The illustration shows the construction of the Beck-Mueller combined ether-vapor and aspirating apparatus for continuous anesthesia in oral surgery. The motor is especially wound for the proper operating speed of the blower and vacuum pump. It will operate continuously without overheating. One side of the armature shaft drives a rotary vacuum pump, the other end a rotary pressure blower, both directly connected to the motor shaft by universal couplings. Both pumps are operated synchronously, and pressure and vacuum can be minutely controlled by a special valve, which acts automatically.

In use the compressed air passes through the ether and ether-vapor is formed, which passes into the heating chamber, thence through a filter and on to the patient, by means of nasal, pharyngeal gag or intratracheal attachments, as required. The heating unit, which is placed under the ether bottle, and the current supplying heat to the heating chamber, as well as to the motor itself, are all operated by a single switch. Sufficient vacuum is produced for all classes of work, not only for operative procedures in the nose and throat, but also in gynecological and abdominal surgery. Connection for the attachment of a manometer for intratracheal insufflation is provided, as well as a valve for connecting up oxygen containers.

SPINAL ANESTHESIA IN ANAL AND RECTAL SURGERY.*

WILLIAM H. KIGER, M.D.,
Los Angeles, Cal.

The one thing that prompted me to write this paper was a statement that I found in a recently published book on "Diseases of the Rectum and Colon" which read: *"Spinal anesthesia has a very limited field of usefulness. Indeed, one is hardly ever justified in using it in Rectal work."* After a personal experience in over five hundred rectal operations without a single unpleasant result I am constrained to differ from the author, and forced to the opinion that he has not given spinal anesthesia a fair trial, or that he, mayhap, did not use the proper agents. I first began to use this form of anesthesia over five years ago, in my clinic at the County Hospital, in cases only where a general anesthetic was contraindicated, such as cardiac troubles and Bright's disease. I found that it had no ill effect in any of these and its use was so ideal that I soon began its use in most all cases in my clinic work, and in many of my private cases. I should like it understood that I am not comparing this method with local anesthesia, for the latter has its distinct place in rectal work. I am attempting to show its superiority over chloroform and ether in this class of operations especially. You are all familiar with the unpleasant things that happen when an attempt is made to dilate the sphincter muscle, if the patient is not profoundly under the effect of one or the other of the two agents mentioned, and your great concern during the operation. None of these unpleasant things happen during spinal anesthesia. Let me call attention, too, to its ease of administration. It requires an expert to administer a general anesthetic, it does not to give spinal anesthesia The proper point to inject the fluid containing the agent injected; and his services are over with, as there is no after attention necessary It requires no greater skill than to do an ordinary spinal puncture in which to obtain fluid for examination, and this is so simple that it has become common practice in most hospitals at least. Again, the saving of time in doing an operation is of great consideration, especially in doing clinical work. If need be, the surgeon can administer the anesthetic, and thus do away with one assistant. In my clinic I frequently have as many as ten cases to operate on in one forenoon. The delays incident to doing an operation under a general anesthetic makes it impossible to operate on this number in this given length of time, and more assistants are required. In doing a rectal operation it is necessary to have complete relaxation of the sphincter muscle under spinal anesthesia you have it without a forcible dilatation, thereby often injuring the parts. The patient is conscious, and you have simply to ask him to strain and the gut will easily protrude through the relaxed muscle, thus making the operation for hemorrhoids easy of doing.

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* Read before the Chicago Laryngological and Otological Society.

* Read before the American Proctologic Association in San Francisco, June 21-22, 1915.

One very great advantage in this method of operating is the avoidance of shock. According to the Crile theory of Anoci-Association stimuli travel to the brain from the source of injury, thereby producing shock; with the spinal cord blocked no shock can occur. I have never yet witnessed any shock after thus operating, although I have spent a considerable time in operating, as for instance in the resection of the rectum. The comparison between the agents to produce general anesthesia and the method in relation to shock is very well shown in the recitation of two cases recently operated on, both cases being Carcinoma of the rectum. One I did under spinal anesthesia. The other patient refused it, preferring to take ether. The one taking the spinal method had no shock whatever, the one taking ether had severe shocks. Another thing to be considered is nausea, vomiting, etc. How often have these things annoyed both you and the patient, often prolonging the operation, and lasting for hours after the operation—under spinal anesthesia no such unpleasant conditions arise. Leaving off that *one meal* before operation is not necessary. Again, the consciousness of your patient is of very great advantage, you can consult him as you proceed, if thought necessary. This was beautifully illustrated a short time ago at the County Hospital in the general surgical clinic. The operating surgeon did not think, when beginning to operate, that it would be necessary to amputate the leg, but saw later that it was necessary. He therefore explained to the patient, who gave his consent. At the hospital it is the rule to require the consent of the patient for or before doing any operation. Under this method you know that the condition of your patient is good. They generally converse with you during the operation, frequently laugh or jest, and wave you a salute as they leave the operating room. How different compared to the groans, moans and cries that follow in the wake of chloroform or ether. In my experience there are but few people but dread to be put to sleep under an anesthetic when you say to him that he does not have to be put to sleep and that he will suffer no pain, with what gladness he accepts it. If you have to operate the second time on the same patient you will have no trouble in getting his consent.

No doubt but that all of you have had your troubles in anesthetising the alcoholic patient—under this method there will be no trouble, either to you or the patient. Another item is the cost of both the anesthetic and its administration. These are saved to your patient, and furthers your praise. The cost of a novocain or a tropacocain injection is only a few cents.

PREPARATION OF PATIENT

The preparation of the patient for spinal anesthesia is very simple There is no meal to be omitted—a simple purgative the evening before the operation, and a free washing out of the bowel just before operating, is all.

The technic is also very simple and easy of application. The patient is first put on the operating table in a sitting position, with the feet resting on a chair, and elbows on his knees with his back bowed. The field of injecting the spinal column is now painted with benzine and iodine. The anal and rectal region prepared as is your custom The main and essential thing is to select the proper point for injection The best is to inject between the vertebrae lowest down The skin and deeper structures around this point are now infiltrated with a per cent solution of novocain, which renders the spinal puncture practically painless Insert the special needle slowly and firmly to prevent breaking When fully inserted a drop of spinal fluid will be noticed oozing from the needle; (place your finger over the top of the needle) attach the small glass syringe, in which has been previously placed one grain of sterile crystals of novocain or tropacocain, draw out enough of spinal fluid to dissolve the crystals, use pressure on the syringe to inject this fluid, and agent, into the space. This completes the operation and the small skin wound is closed by the application of collodion. The patient is now placed in position on the operating table for the rectal operation. I imagine that the reason that some object to spinal anesthesia is based upon the fact that cocain was used during the first attempts to produce it and some deaths were recorded; however, my experience as herein recorded shows novocain has supplanted its use, and no danger need be feared. It is the least toxic of all agents used for this purpose, and it is the one used in my clinic to the exclusion of all others. Again, it was urged as an objection to this form of anesthesia that it did, or might be followed by paralysis, neuritis, and various other bad effects, but after five years' experience in the use of novocain I have yet to see any ill effect that could be traced to its use The only unpleasant symptom that has ever occurred is that a few of my patients have complained of an occasional headache, which usually passes away in a few hours.

I am in the habit of administering a few small doses of strychnia which abates this symptom. I have noticed headache following spinal puncture to obtain fluid for analytic purpose oftener than I have following spinal anesthesia. Especially is this method to be employed in the tubercular patient who misses no meal and needs all the nourishment he can get.

Consolidated Realty Bldg.

EXPERIMENTAL AND CLINICAL OBSERVATIONS ON THE BLOOD-PRESSURE IN SPINAL ANESTHESIA *

George Gilbert Smith, M.D.,
Boston, Mass.

The use of ether in urology has been attended by certain dangers, the chief of which resides in its effect upon the kidneys. It seemed, therefore, when spinal anesthesia was made practicable, that this method for urological cases would prove to be ideal. In many instances such has been the case. In others, we have been distressed by the severe and alarming fall of blood-pressure which accompanied and was apparently due to this method of anesthesia.

In a number of our spinal anesthesias in which the blood pressure was followed there was a marked fall, which in some cases amounted to 100 mm. of Hg. In several cases the blood pressure fell even below 45 mm. Hg., which was the lowest level recorded by the clinical apparatus. These extremely low pressures occurred only in a small proportion of spinal anesthesias; in most instances the blood pressure fell to 75 or 80 mm. Hg. Always with the more pronounced drops, and at times with the drops of moderate degree the patient exhibited the signs of shock—namely, pallor, sweating, nausea, air hunger and a pronounced sense of uneasiness. The pulse always remained between 60 and 90, and did not increase in rate as the blood-pressure fell. The above mentioned signs appeared in from 10 to 20 minutes after the introduction of the drug, and passed off as the blood-pressure began to rise, which it usually did 10 to 15 minutes later. Several cases which had been through this rapid change of blood pressure had cardiac decompensation within 24 to 48 hours after operation, and although the influence of the operation (usually suprapubic prostatectomy) could not be disregarded, it seemed to us that the spinal anesthesia might well have been an important factor in disturbing a heart which was perhaps not in the best condition to go through such an ordeal. It is fair to say that none of the cases in which a minor operation or cystoscopy alone was done had cardiac decompensation afterwards. It may be that as most of the cases of this class were young men their cardiovascular systems were better able to stand the fluctuations in blood pressure, whereas the older men, who had prostatectomies, were often in advanced arteriosclerosis.

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* Read before the New England branch of the Urological Association.

However that may be, it is a fact that in a considerable percentage of cases the blood-pressure fell to a disturbing degree. Physiologists have found that in animals in which a blood-pressure of less than 35 mm. Hg. is induced for more than 15 minutes a number of nerve cells are actually killed from anemia and the consequent lack of nutrition. It is not unlikely that the very low pressures sometimes seen during spinal anesthesia contribute to post-operative shock through depriving the higher centers of their proper blood supply.

The occurrence of this fall in blood pressure in some cases seemed to us a danger grave enough to contraindicate spinal anesthesia in those very cases in which its use, from other points of view, was most desirable. With a view to finding out the cause of the low pressure, and if possible a means of preventing it, I took the question to Prof. W. T. Porter, and in the laboratory of comparative physiology of the Harvard Medical School we attempted to solve it through experimental methods.

The cat was the animal selected. Fifty were used, and as in many of them more than one experiment was done, we gathered records of 74 different injections.

The cats were lightly anesthetized and then stretched on the cat board. The carotid artery was exposed, connected with a membrane manometer, and a cannula was put in the trachea so that artificial respiration could be established. We found that the changes in blood pressure and the tests of anesthesia were so much influenced by muscular reactions that we could not tell for sure just what was happening, and if the cat became too deeply etherized the reflexes disappeared. Therefore, we abandoned the use of ether throughout the experiments and used curare alone. The animal was turned over on its belly and, as I found that it was impossible to get the needle into the dura with certainty without doing a laminectomy, in every case laminectomy was done. We are well aware that there are certain forces within the spinal sac which keep up the movement of the spinal fluid. It is known, for instance, that respiration tends to cause movements of the spinal fluid; this effect must have been more or less offset by these windows through the spine. Also in considering the effect of gravity one must allow for the influence of atmospheric pressure when the tube is open at the end. We tried to make allowances for these sources of error, and we feel that the information obtained is substantially accurate. The needle was inserted through the dura and the fluid injected into the cerebro-spinal fluid at the lower lumbar region, where the cord becomes very small. In that region the needle can be inserted perpendicularly into the long axis of the cord. Higher up the needle has to be inserted more or less parallel with the axis of the cord, and the direction of the injection is thereby changed. We have endeavored to consider all these factors in noting the principles underlying the distribution of the drug.

Tropacocain and novocain, with and without adrenalin, were the drugs used. Adrenalin alone injected into the spinal canal was found to have no effect upon the blood-pressure.

The literature from 1900 to March, 1915, contained no conclusive work on the blood-pressure during spinal anesthesia. A number of writers mentioned the fall in blood-pressure, but attributed it to the effect of the drug upon the bulbar centers. In our experience with cats under ether alone, if the injection was made into the spinal sac below the phrenic nerves (5th cervical) and ascended to the medullary centers, respiration was always paralyzed. In the 125 cases in which spinal anesthesia was used on the genito-urinary service at the Massachusetts General Hospital no case showed respiratory paralysis. The fall of blood pressure, therefore, cannot be attributed to the influence of the drug upon the bulbar centers.

It has been shown that the blood-pressure is dependent largely upon the condition of the blood vessels of the splanchnic area. The mechanism by which the pressure in this area is regulated consists upon its efferent side of three links: (1) the bulbar centers, (2) the efferent vasomotor tracts which run in the antero-lateral columns of the cord, (3) the vasomotor fibres which pass out with the anterior roots of the cord from the 5th dorsal to the 3d lumbar segments. (Howell: American Text-book of Physiology, vol. i, p. 206.)

In our experiments it appeared that all of these links of the vasomotor mechanism were susceptible to paralysis by novocain. When, however, the drug is injected in the lumbar region, as in spinal anesthesia, its effect as it diffuses throughout the spinal fluid is felt first and chiefly by the vasomotor fibres of the anterior roots.

As a result of our work, the following conclusions may be drawn:—

1. The blood-pressure can be lowered as much by spinal anesthesia as by section of the cord in the cervical region.

2. The greatest fall was caused by injection of the drug in the thoracic region, where the vasomotor fibres which supply the splanchnic area leave the cord.

3. This part of the vasomotor mechanism is the first affected by the drug when the injection is made in the lumbar region.

4. The extent of diffusion of the drug within the dural sac appears to be influenced more by the bulk of the solution injected than by any other one factor.

5. A given amount of drug in a concentrated solution diffuses less and consequently lowers blood pressure less than does the same amount of drug in a more dilute solution.

6. The greatest effects upon blood pressure were noted when adrenalin was combined with novocain.

7. Entire fixation of the drug does not take place within 20 minutes after the time of injection.

8. When a solution of greater specific gravity than spinal fluid is used, the extent of diffusion may be increased by gravity.

9. Attempts to raise the blood pressure by the intravenous injection of pituitrin or adrenalin gave only a very transient rise.

BUCKLEY'S PASTE AS A DESENSITIZING AGENT.*

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Bloomsburg, Pa.

Obviously any method or remedy for the elimination of pain in filling teeth is more or less dangerous when placed in the hands of the profession in general.

The dental pulp is a highly sensitive and highly vascular structure that is keenly sensitive to shock; and whether the shock be traumatic, mechanical, or chemical matters little in so far as its death is concerned, if that shock be sufficiently intense.

TRIOXYMETHYLENE AND ITS ACTION.

Trioxymethylene, the main ingredient in Buckley's desensitizing paste, is polymerized formaldehyd, and formaldehyd is a violent irritant to animal tissue, therefore the use of the paste in all cases of deep-seated caries should be attended by the most rigid care and precaution. In other words, due consideration must be given to diagnosis and to prognosis if subsequent disagreeable complications are to be averted.

Parenthetically, we do not advocate the indiscriminate removal of vital pulps in adult teeth, but we do contend that their removal under aseptic conditions in cases with a clearly doubtful prognosis is to be considered preferable to awaiting until the pulp dies and becomes septic.

MODE OF APPLICATION.

As a desensitizing agent Buckley's paste occupies a position peculiarly unique and beyond question, provided it be sealed in the cavity. That is the only objection to its use that we have to record up to the present time, viz., it must be sealed in the cavity. Any of the plastics, preferably one of the temporary cements or temporary stopping, may be used for that purpose. The writer prefers where possible to use either Gilbert's or Fell's temporary stopping; both become very plastic at low heat—Fell's at even a lower heat than Gilbert's—and they are easily and quickly molded into the cavity without undue pressure. They have the additional advantage, if properly manipulated, of forcing the gum tissue away from the cervical margin of the cavity in those cases where this is necessary, and as a sealing medium they leave nothing to be desired so far as my observations have gone.

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* Read before the Susquehanna Dental Association of Pennsylvania at its annual meeting, Wilkes-Barre, May 18, 1915.

Our regular routine consists in excavating and filling the cavity on the day following the application of the paste, but for the following various reasons that procedure is not always possible: (1) It occasionally happens that more than one application of the paste is necessary in order to desensitize all the sensitive area for thorough cavity preparation, this applying more especially to superficial cervical areas, or to cases requiring considerable cutting in sound dentin. (2) Separation of the teeth may be essential to a complete anatomical restoration, and may not have been obtained prior to the application of the paste. (3) Time, either the patient's or the operator's, may not permit its employment.

EFFECT OF THE PASTE.

This brings us to a consideration of two valuable features of the paste. After a few hours, its chemical action seems to cease, but the desensitizing effect lasts for several days, which means that we have ample time in which to do painlessly any operation desired or essential in so far as the cavity to which the paste has been applied is concerned.

It is to be noted that the action of the paste is confined to the tooth area upon which it is placed, and that it has no numbing effect upon the pulp.

Placing the paste in a mesial cavity does not desensitize a distal or a cervical cavity in the same tooth, nor will the entire surface of the cavity be desensitized unless the paste is in contact with or has access to the entire sensitive area.

In view of their vitality being subsequently restored, we are inclined to think that the fibrillæ are paralyzed rather than that their vitality is destroyed.

The writer had an approximo-occlusal gold filling in an upper first molar which had decayed at the cervix, the decayed area being exceedingly sensitive. The filling was removed, and desensitizing paste placed upon the sensitive area only. Two days after the application of the paste all that area was cut away without any discomfort whatever. But when it was found necessary to do some cutting for retention at the occlusal aspect, the dentin was as normally sensitive as though no paste had been used—and it is to be noted that no caries was present at or even near to that point.

PRECAUTIONS.

A precaution that should invariably be observed in restoring cavities with metal fillings is to use nonconducting linings in all those cases which experience has taught us will be sensitive to thermal change. A cavity in which the paste has been used does not respond readily to change of temperature at the time of operating, but it should not be taken for granted that it will not subsequently do so. In fact, we consider it excellent practice to use a non-conducting lining under every metal filling, whether desensitizing paste has or has not been used.

It occasionally happens that after applying the paste, an uncomfortable feeling in the tooth is experienced; rarely does this amount to a distinct ache, it may rather be characterized as a *growl*, and is due, we assume, to the irritating property of the formaldehyd.

In very deep-seated cavities, it not infrequently happens that a major portion of the decay can be removed with but little if any pain, and especially is this so in that part of the cavity immediately over and surrounding the pulp. In all such cases it is advisable to cover the dentin immediately overlying the pulp with some protecting material such as temporary stopping or one of the cavity linings, or both, and then apply the paste directly to the sensitive area. We thus protect the pulp from a too direct action of the formaldehyd, and as a consequence shock through irritation is greatly minimized if not entirely eliminated.

It is really surprising what a small quantity of paste is required to accomplish the desired result. *One gram of the preparation is sufficient for about fifteen applications. On this basis the amount necessary for one application contains neothesin 1/300 grain, thymol 1/270 grain, and trioxymethylene 1/13 grain.* As a precautionary measure, we would emphasize the importance of using only the minimum quantity, but placing that quantity where it is required, keeping in mind constantly that its use should be accompanied with cool judgment and intelligence rather than effusive enthusiasm.

FURTHER CLINICAL DATA NEEDED TO PROVE HARMLESSNESS TO THE PULP

The important problem that we have to solve at this time is, Has the paste any deleterious action upon the dental pulp, and, if so, under what conditions? That cannot be solved by any hit-or-miss procedure of practice, either in the application of the remedy or the records of the case in which it is used.

CONCLUSION.

Six months' use of the paste by the writer in various cavity conditions, without any unfavorable results, leads to the conclusion that at last we have a formula which as a desensitizing agent is distinctly worthy of a most prominent place in our dental armamentarium. It is not only a wonderful relief to our patients to know that they are going to be practically free from pain during excavating and filling operations, but it relieves the operator of a great burden. Furthermore, its use reduces scientific cavity formation to a reality in all those cases in which heretofore, owing to extreme sensitiveness, a compromise had to be made.

Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

Acetonuria and Carbohydrate Starvation. S. H Blodgett, Boston. New York Medical Journal, August 28, 1915.

Acetonuria and Diacetic Acid, Elimination of in 214 Surgical Cases. M. R. Bradner and S. P Reimann, Philadelphia. American Journal of the Medical Sciences, November, 1915.

Acidosis, Phenomena of and Its Dominating Influence in Surgery. George W. Crile, Cleveland. Annals of Surgery, September, 1915

Anesthesia, General and Spinal, for Prostatectomy. J. D. Mortimer, London. Lancet, October 23 1915

Anesthesia and Analgesics in Labor. Their Indications and Contraindications. W. S Gillespie, Cincinnati. Ohio State Medical Journal, October, 1915

Anesthesia and Analgesia Injurious Action of on Central Nervous System and Means of Preventing It. E. Weber. Medizinische Klinik, August 29 1915 (Continued from April 25, 1915.)

Anesthesia, Surgical. T. C. Burns, Oklahoma City Oklahoma State Medical Association Journal, October, 1915.

Anesthesia, Surgical, Discrimination in the Use of Methods to Produce. E Fischel, St Louis Missouri State Medical Association Journal, October, 1915.

Anesthetics C. S. Skaggs, East St Louis, Mo. Lancet-Clinic, September 18, 1915

Anesthetics, The Choice and Technic of the Arthur Dean Bevan, Chicago. Journal of the American Medical Association, October 23, 1915

Anesthetic Risk in Surgery. T. L. Dagg, Chicago. New York Medical Journal, October 20, 1915.

Apparatus—An All Metal Syringe for Local Anesthesia. J. H. Jacobson, Toledo, O. American Journal of Surgery, September, 1915.

Apparatus—Pharyngeal Tube Combining Rebreathing and Insufflation. F. W. Pinneo, Newark, N. J. Journal of the American Medical Association, October 9, 1915.

Apparatus—Vaporized Ether from a Thermos Flask. Wm. Fawcett Shaw, Brooklyn. Medical Times, November, 1915.

Apparatus—New Method for Production of General Analgesia and Anesthesia. D. E. Jackson, St. Louis. Journal of Laboratory and Clinical Medicine, October, 1915.

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Chloroform of Russian Manufacture. P. I. Tikoff and L. M. Sicheva. Russkiy Vratch, xiv, No. 23.

Chloroform Poisoning, Amyl Nitrate in. J. S. Gilman, C. J. Devine and T. M. Barber, Richmond, Va. Southern Medical Journal, October, 1915.

Chloroform Poisoning, Studies in Liver and Kidney Function, in Experimental Phosphorus and. E. K. Marshall and L. G. Rowntree, Baltimore. Journal of Experimental Medicine, September, 1915.

Chloroform Syncope, Relation of Ventricular Fibrillation to Clinical. E. H. Embley, Melbourne, Australia. Lancet, August 7, 1915.

Circulation, Disturbances in, from the Effects of Shock Toxins. R. Mauter and E. P. Pick. Muenchener Medizinische Wochenschrift, August 24, 1915.

Ether Anesthesia. W. A. Boyd, Columbia. South Carolina Medical Association Journal, October, 1915.

Ether Inhalations for the Symptomatic Treatment of Gallstone Colic. P. Aubert. Lyons Medicale, cxxiv, No. 6.

Ether, the Use of for Anesthesia During Normal Labor. H. L. Christensen. Hospitalstidende, Copenhagen, August 11, No. 32, 1915.

Ether Anesthesia of Animals Fed on Different Diets, Dextrose and Diastase Content of Blood as Affected by. E. L. Ross and H. McGuigan, Chicago. Journal of Biological Chemistry, September, 1915.

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A CLINICAL LECTURE ON ANEURISMS OF WAR WOUNDS.*

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The war is multiplying instances of lesions which, although observed in civilian practice, are not common therein. Traumatic aneurism is an instance of this.

By a traumatic aneurism is understood an abnormal swelling associated with a bloodvessel, and caused by a trauma or wound of the vessel. There are several varieties of such swellings, and these may be conveniently classified thus:

a. Traumatic arterial aneurism.
    i. Diffused.
    ii. Circumscribed.
b. Traumatic arterio-venous aneurism.
    i. Aneurismal varix.
    ii. Varicose aneurism.

The characters of these varieties will be seen by reference to the diagrams.

The first (Fig. 1) is a diffused traumatic arterial aneurism, and shows all three coats of the artery damaged. Immediately blood pours out from the aperture and clots externally, though liquid blood still remains in the center. The surrounding tissues are pushed away from their proximity to the artery, consequently a cavity is formed without any real wall, hence there is no real sac, and the lesion is not a true aneurism, for an aneurism has a sac wall. Then there are three varieties of circumscribed traumatic arterial aneurism. In the first of these the blood is poured out in exactly the same way as above, but by clotting it has acted as a foreign body, and inflammation occurs around and produces condensation of the tissues, so as to form a pseudo-sac, so that for all practical purposes here is a sacculated aneurism, circumscribed by a false sac wall.

The second variety (Fig. 2) is much less common. Frankly, I am not sure that it really occurs, but as it is given a place in some text-books, I mention it. There has been a wound of the external and middle coats of the artery, the internal coat remaining undamaged. Obviously, the pressure of blood on the thin internal coat is enough to make it bulge, and for the time being a circumscribed traumatic aneurism exists, but the pressure becomes greater, causing the thin sac wall to give way ere long.

The third variety is that in which there has been a wound of the artery which has healed, but the scar is a weak spot. This may afterwards become distended by the intra-arterial pressure, and an aneurismal sac will be formed.

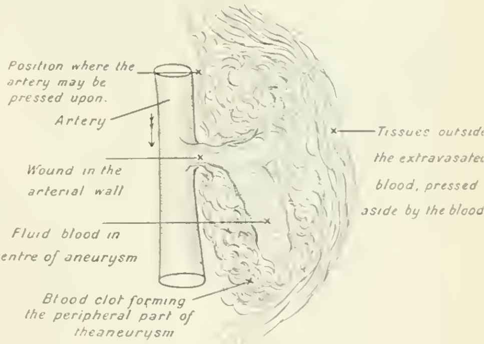
Position where the artery may be pressed upon.
Artery
Wound in the arterial wall
Fluid blood in centre of aneurysm
Blood clot forming the peripheral part of theaneurysm
Tissues outside the extravasated blood, pressed aside by the blood

Fig. 1.

The next diagram (Figs. 3 and 4) shows the two varieties of arterio-venous aneurism, in which there is a wound of both the artery and the adjacent vein, and a communication between the two. The commonest form of an arterio-venous aneurism is an aneurismal varix. As a result of the communication which has been established between the two, part of the arterial blood passes through this communication, and goes distalwards along the vein, thereby obstructing somewhat the return of the blood through the vein, and the vein becomes enlarged at the level of the junction of artery and vein.

The other variety is that of a true aneurismal sac lying between the artery and vein. There has been a wound of the artery and the vein. The two vessels have not come into contact but blood passes from one to the other, and a pseudo-sac forms between the two. The blood pressure in the artery being the higher, the blood passes through the sac, and into the vein, and the vein tends to bulge opposite the site where the sac communicates with the vein. The war has produced a larger number of these cases than we have had for a long time, and I think it will go on producing them.

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*Delivered at St. Bartholomew's Hospital, Nov. 17th, 1915

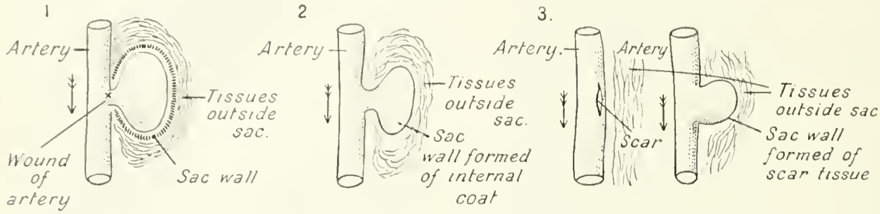


Fig. 2.

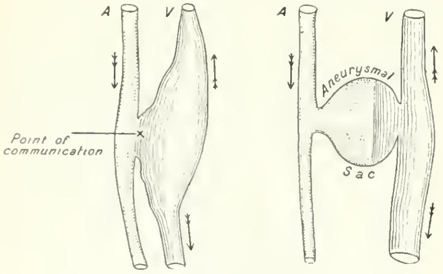
In the October, 1915, issue of the *British Journal of Surgery,* are collected 50 cases of traumatic aneurism. I have analysed them in the table below.

Analysis of 50 Recorded Cases of Traumatic Aneurism

Number: 50.

Type: Arterial, 30. Arterio-venous, 30.

Position: Head and Neck	7	
Upper Limb	14	
Lower Limb	29	
Arteries Involved:		
Head and Neck:		
External Carotid	1	
Facial	1	
Superficial Temporal	1	
"Base of Skull"	1	
Common Carotid	3	= 7
Upper Limb:		
Subclavian	2	
Axillary	5	
Brachial	5	
Ulnar	1	
Radial	1	= 14



Figs. 3 and 4.

Lower Limb:		
Common Femoral	1	
Superficial Femoral	8	
Deep Femoral	1	
Popliteal	13	
Posterior Tibial	5	
Anterior Tibial	1	= 29
Mortality—Deaths: 4 = 8%.		
Vessels Involved:		
Common Carotid	1	
Subclavian	1	
Superficial Femoral	2	= 4

With regard to the arteries of the head and neck the cases were 7 in number. It might have been thought that arteries in this region would have been more commonly injured than those elsewhere. But it has to be remembered that if a man is shot in the neck and even has his common carotid artery wounded, he may not get very much external bleeding, but other important structures in the neck may be damaged, such as the vagus, and death results. The lower limb is the site in which traumatic aneurisms mostly occur. The superficial femoral was injured in 8, and the popliteal in 13; and it is a very interesting fact that the popliteal artery is also the commonest site in a limb for an aneurism in civil practice. I think this may be explained in two ways. First of all, wounds of the leg are common; at any rate, soldiers who receive wounds in the leg frequently survive. The second reason is, that the popliteal artery has very little tissue surrounding it except fatty tissue, which gives very little support.

With regard to the mortality shown in our table, this is strikingly low, because it would have been expected, in these cases, to have a very much higher mortality than this series shows. There were 4 deaths in the 50 cases, a percentage of only 8. None of the popliteal cases died.

Now a word or two with regard to the local signs and symptoms of these traumatic aneurisms. The first is a swelling in the line of the vessel. It may be very slight, but it is usually quite evident. Secondly, this swelling pulsates, and the pulsation has practically all the signs of that of an aneurism seen in civilian practice; i. e., it is expansile, it ceases when the main artery is compressed on the proximal side of the swelling, and it begins again with a series of pulsations corresponding to the pulsations or beats of the heart when the pressure is removed. There is also a bruit, and the bruits of these traumatic aneurisms are usually much more marked than of the ordinary pathological aneurism. The bruit of an arterio-venous aneurism has its own distinctive character, namely, that of being a continuous humming or buzzing bruit. It is very distinctive when once heard. Again, the thrill which is present in these traumatic cases is more harsh than in aneurisms met with in ordinary practice.

Sometimes, when there is a good deal of clot, there are few, if any, local symptoms or signs, other than swelling. Pulsation may disappear, bruit may cease, and thrill may entirely go; so that swelling alone is left, and the aneurism is on its way to become cured. With regard to the distal signs and symptoms, there is practically always some edema of the distal part of the limb, which is due to the aneurismal swelling pressing upon the vein, and so preventing a proper return of blood; and, secondly, the *vis a tergo*, the force behind in the artery, is diminished in the periphery, with the result that the blood does not come back so easily in the veins, and so edema results. For the same reasons, congestion due to dilatation of the superficial vessels is produced.

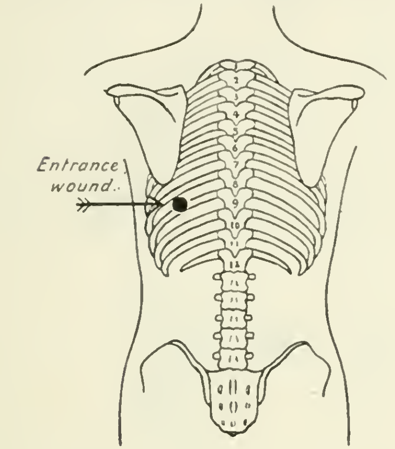


Fig. 5.

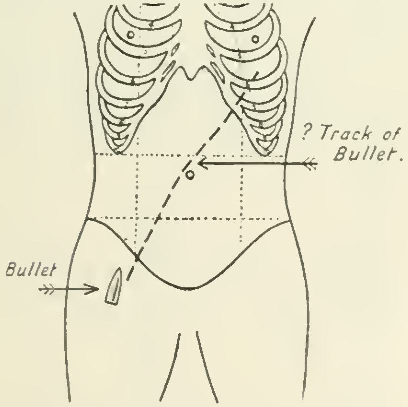


Fig. 6.

Further, there is an alteration of the pulse. The pulse on the affected side is smaller, and very frequently it is delayed as compared with the sound side. And, lastly, there is very characteristic pain, pain due to pressure upon the main nerves at the site of the aneurism, but referred to the periphery. Before proceeding further, I want to give the history, and some diagrams of two cases of injury of arteries, the second with a distinct aneurism, which have been treated at the 1st London General Hospital since the publication of the 50 cases in the *British Journal of Surgery.*

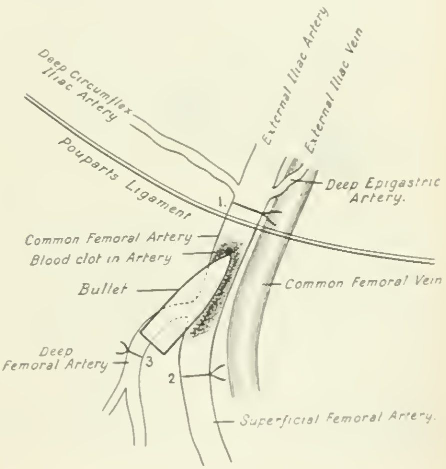


Fig. 7.

The first is a case of wound of the right common femoral artery. Sapper G. W. was wounded on August 26, 1915, the bullet entering the thorax below the lower angle of the *left* scapula. There was immediate dyspnea, and later he had hemoptysis. From the latter he soon recovered.

On September 30th, 24 ozs. of blood-stained pleural fluid were evacuated. He had pain on the left side of the chest running up to the axilla. He was admitted under our care at the 1st London General Hospital on October 16th, and on that date he had no physical signs on the left side of the chest. No exit wound could be discovered, and on x-ray examination a bullet was discovered in the right groin, with the point turned upwards; evidently it had turned during its passage through the tissues as the entrance wound was very small.

It will be observed that the bullet traversed part of the thorax downwards across the abdomen and into the groin. At the operation 9 weeks after the vound, the sharp point of the bullet was found to iave penetrated the wall of the common femoral .rtery, (see Figs. 5, 6 and 7), and was surrounded y blood clot. I ligatured the vessel on the proximal ide, but on removing the bullet there was furious iemorrhage. This was due to the fact that in the nterval between receipt of the wound and the operaion there had been time for an efficient collateral irculation to be established and it was from the uperficial and deep femoral arteries that the iemorrhage occurred. I had perforce to ligature oth these branches of the common femoral before leeding could be arrested.

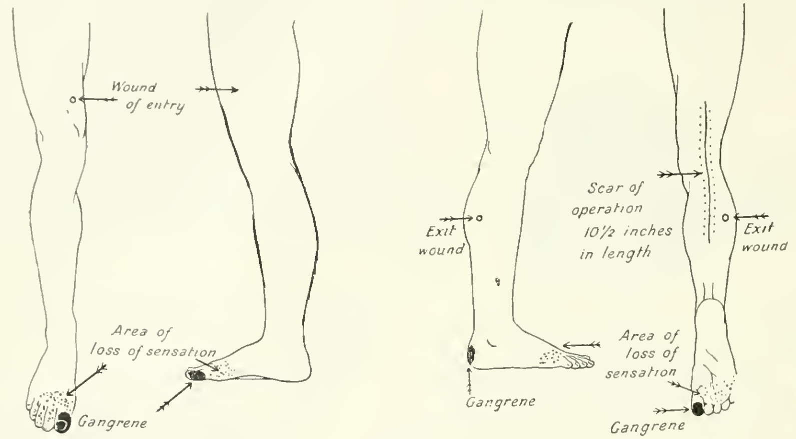
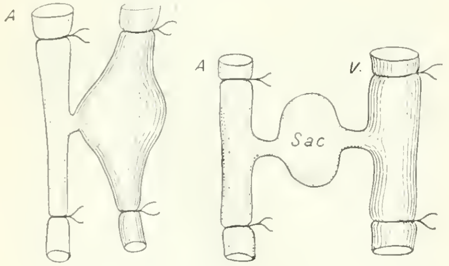

Wound of entry
Area of loss of sensation
Gangrene
Exit wound
Scar of operation 10½ inches in length
Exit wound
Area of loss of sensation
Gangrene
Gangrene

Fig. 8.

The case has made an uninterrupted recovery, he pulsation in the posterior tibial being now quite strong, and there has been no edema of the foot, or any suspicion of even superficial gangrene. There vas no damage to any of the veins.



Figs. 9 and 10.

The next case is that of a sergeant, James F., age 25, who was wounded on September 24, 1915, by a bullet from a machine gun. It entered above the inner side of the right knee, and made its exit on the outer side of the right calf (see Fig. 8). He was admitted to the Liverpool Merchants' Hospital on September 28, 1915. The right foot was at that date, cold, bluish, having no perception of touch, and no pulsation could be detected in the posterior tibial artery. There was no swelling to be either seen or felt in the right popliteal space; but by means of the stethoscope a loud bruit could be heard which was conducted some way down the right leg.

On October 3rd he complained of severe pain in the right calf, and there was some discoloration. There was no improvement in the condition of the right foot, and gangrene was threatening. On October 4th an incision was made over the back of the lower part of the thigh, and upper part of the leg, 10½ inches in length. The contents of the aneurism were turned out, and the popliteal artery was tied on the proximal and distal sides of the sac. The popliteal vein was also found to be damaged, and was therefore ligatured in two places. The leg was discoloured but that was chiefly due to extravasated blood. The next note is dated October 29th, and then there had been steady improvement since the operation, though a good deal of pain was still being felt in the foot, and the end of the right big toe was black. No definite line of demarcation had, however, yet formed. There were

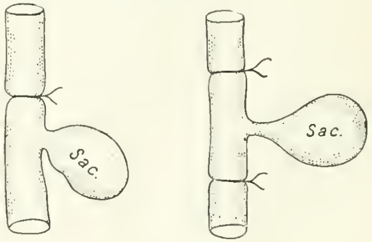


Fig. 11.

to be seen superficial gangrenous patches on the heel and the fifth toe, and some edema about the ankle. The range of movement of both right knee and ankle was somewhat restricted. He was admitted to the 1st London General Hospital on October 30th, and on November 5th the patches of gangrene still remained, and though movement of knee and ankle was still restricted, the limitation was less than formerly.

With regard to the treatment of traumatic aneurisms there are one or two important general points. First, do not deal with them by operation until such a procedure becomes absolutely necessary, for by waiting as long as possible there is a chance for a collateral circulation to be established, and there is less likelihood of the occurrence of gangrene. Another case of mine, recorded in the *British Journal of Surgery*, was that in which I had to ligature the common femoral artery, because the man had a rapidly enlarging aneurism following trauma. The operation was performed within four days of his injury, and gangrene immediately supervened, and I had to amputate through the middle of his thigh in order to save his life.

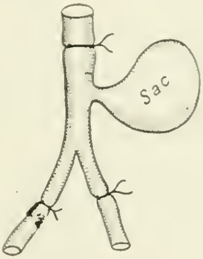


Fig. 12.

Secondly, always be prepared for violent hemorrhage. It may not always be possible to apply a tourniquet on the proximal side of the aneurism. It is in these cases that a skilful assistant is of the highest value.

Thirdly, make a good incision so as to have abundance of room within which to work.

There are at least three possible methods of dealing with traumatic arterial aneurisms. I. Ligation of vessels. II. Operation on the sac. III. Amputation.

I.—*Ligation of vessels.*

To ligature the main artery on the proximal side of a traumatic aneurism is almost certain to be followed by gangrene in the periphery unless there has been time for a sufficient collateral circulation to become established. To ligature the main artery alone on the proximal side, even when no gangrene follows is a somewhat risky procedure, and never a certain cure. It is risky because it may not control the bleeding, it is uncertain because the aneurism may advance even in spite of the ligation. The application of ligatures on the artery or arteries, on the proximal and distal sides of the aneurism is quite the best method of treating these cases (Figs. 9 and 10). It is fairly easy, it should effectually stop hemorrhage, and is not more likely to be followed by gangrene.

II.—*Operation on the sac.*

A tourniquet having been applied on the proximal side, the aneurismal sac is exposed by a good length incision, and an opening made into it. The clot is turned out, and the mouth of the vessel entering and leaving it found. A probe may now be passed into each vessel, the vessels exposed externally above and below and a ligature applied to each (Fig. 12). The sac itself may be excised in many cases. This is an ideal method of treatment but not altogether an easy one, and causes a good deal of disturbance, particularly if the wound is septic.

III. Not only is *amputation* required if gangrene has supervened but it may be the safest as a primary treatment where there is a diffused traumatic arterial aneurism.

An arterio-venous aneurism, whether of the type of aneurismal varix, or varicose aneurism is best treated by a ligature of both vessels on both sides of the communication between the artery and vein, and if possible an excision of the portion intervening, and of the sac if there be one.

The mortality after these operations is not so great as would be supposed. In the table it will be seen there were only 4 deaths, making a mortality of only 8%. The vessels involved in the fatal cases were the common carotid once, the subclavian once, and the superficial femoral twice.

Goiter.

According to symptoms, goiter cases easily fall into three groups: In the first group we have the symptoms of toxemia and underoxidation. This group is composed of the early cases before the augmentor and inhibition apparatus have lost their balance and damaged the circulation. However, a low grade of endocarditis is always present. In the second group are those cases usually called exophthalmic. In these cases we have tremor, weakness, exophthalmos, thyrotoxis, tachycardia and hypertension. In the third group, no tachycardia, no increase in the blood pressure, but we have the same toxic symptoms of depression, tremor, cold skin, sweating, etc., and usually pronounced mental and emotional symptoms, with a slow pulse and dull eye.—Edwin B. Sloan in *The Chicago Medical Recorder.*

THE SURGICAL TREATMENT OF GOITER.

John M. Wilson, M. D.
Mobile, Ala.

Notwithstanding the fact that a great many of our authorities on medicine and surgery believe that the treatment of goiter is in a majority of cases medical, this has not been my experience. It may be that the majority of cases coming under my care have all been well advanced and therefore past the borderline of medical treatment. Operations on the thyroid gland are performed for the removal of one or both lobes or a part of one or both lobes. Sometimes the operation of ligating the vessels is performed without removing any gland tissue.

It is important that the operator should be familiar with the anatomy of the thyroid as well as its relation to neighboring structures. The gland, which consists of an isthmus and two lateral lobes lies in front of the trachea, the isthmus crossing the second, third and fourth tracheal rings while the lobes dip down to about the level of the sixth ring. The gland receives its blood supply from the superior and inferior thyroid arteries, and the thyroidea ima. The superior thyroid branches off from the external carotid just above the bifurcation and enters the gland from above. The inferior thyroid artery does not enter the gland from below as one would suppose, but to the side posteriorly. It is a branch of the thyroid axis. The gland gets some of its blood supply from beneath through the thyroidea ima artery which usually springs from the innominate. The gland has a thin capsule of its own, as well as a capsule of fascia which is the pretracheal fascia. This fascia dips down from the gland to the trachea and also helps to form a sheath to the vessels entering the gland. In our approach to the gland we find it covered by the omo-hyoid, sterno-hyoid and sterno-thyroid muscles. These muscles usually have to be cut. As a rule the sterno-mastoid muscles which lie to the side of the gland can be pushed away without cutting. In those cases of large goiter where it dips down behind the sternum we have to look out for the left innominate vein.

There are three sets of veins, the superior, middle and inferior thyroid, and sometimes an accessory which when present is between the middle and inferior. The veins usually run beneath the capsule and ramify to form a plexus. These veins in some cases of goiter become very much enlarged, and usually communicate freely across the upper and lower portions of the isthmus. In goiter operations we must not forget the parathyroid bodies which, usually four in number, lie in the loose connective tissue forming the outer capsule of the gland. The superior parathyroids usually lie at the posterior edge of the thyroid gland about the junction of the middle and upper third. Inferior parathyroids usually lie behind the gland near its lower pole. They are small brownish bodies, possessing a capsule of their own and having their own blood supply through the parathyroid artery, a branch of the inferior thyroid. Another important structure is the recurrent laryngeal nerve which lies behind the capsule of the gland to the side of the trachea close to the inferior thyroid artery.

We have various forms of goiter to deal with. We find the different kinds of adenoma, cystic and circumscribed goiter, as well as diffuse hyperthrophy. There may be sarcoma or carcinoma of the thyroid gland. One might occasionally encounter a fibrous goiter, but this seems to be rare. The disease known as hyperthyroidism, or Graves' disease, is the form of thyroid abnormality that seems to be most disastrous in its results. This is not a new disease, yet it seems to have been neglected surgically until recent years. Parry as far back as 1786 described this disease. Adelmann called attention to the goiter heart in 1828, and in 1835 Graves described the disease clearly. Moebius pointed out in 1846 that exophthalmic goiter was caused by the poisoning of the body through a diseased activity of the thyroid gland, and not, as it was formerly supposed, due to a lesion of the central nervous system, nor to a pathological condition of the sympathetic system, and also showed that it was not a form of hysteria. In this condition there is too much thyroid secretion thrown out into the circulation.

In 1882 Kocher described myxoedema, or cachexia strumipriva. This condition is brought about by a disease of the gland in which too little secretion is given out into the circulation. This condition will result if the entire thyroid is removed, hence we always leave a lobe or a part of a lobe behind. If the parathyroid glands are removed a fatal condition known as tetany will result. Very rarely a hyperthyroidism and hypothyroidism will exist at the same time. This, of course, is a hard condition to treat, but the portion of gland that is hyperactive should be removed, or a part of it, and then the myxoedema is to be treated by administering thyroid extract by mouth.

The indications for operation in all forms of goiter other than exophthalmic are, first, pressure symptoms; second, when the growth becomes large enough to be troublesome or to cause deformity. It is also well to bear in mind that the growth may become malignant if not removed. Exophthalmic goiter, readily diagnosed when the symptoms are marked, is very frequently overlooked in its incipiency. It is very important that the diagnosis be made early, because serious damage once done by continual pouring excessive thyroid secretion into the circulation cannot be overcome. Tachycardia seems to be the first early symptom. There is usually enlargement of the thyroid gland, but this may not be the case, as some of the worst cases of hyperthyroidism that I have ever seen were those in which the gland was scarcely perceptible. Exophthalmos may not come on until the disease is well advanced. It may vary from a slight protrusion to complete dislocation of the eyeballs from their sockets. In all cases of tachycardia in which there can be found no other cause hyperthyroidism should always be suspected. These patients are usually very nervous and irritable and become fatigued very easily. Muscular tremor and weakness are usually present. These patients very frequently have spells of sweating and intermittent diarrhea without apparent cause. Disturbances of digestion may be present. Sometimes in these cases there can be found discoloration of the skin in different places. They complain of headaches frequently. Emaciation and anemia come on in the later stages of the disease. Great relief is afforded by operation in properly selected and prepared cases of Graves' disease. When the disease has been going on for a long time and there have been marked degenerative changes in the heart muscle and other muscles of the body operative measures are not only risky but useless. On the other hand when these cases are treated surgically in their early stage the results are good. The disease seems to occur by far more often in women than in men.

The technic of the operation may be briefly described as follows: A specially prepared cushion is used to place under the patient's neck so as to push the front of the neck forward and thus render the field of operation more accessible. The collar or inverted horseshoe incision of Kocher is the one that gives the best results. The incision is begun at a point a little above the level of the most prominent portion of the larynx at the outer border of the sterno-mastoid muscle and extends downward to about half an inch to one inch above the sternum to ascend to a similar point on the opposite side. The skin is dissected back and all bleeding vessels clamped. Plenty of hemostats should be on hand. The large veins that will come into view should be clamped and cut between forceps, and the fascia cut across from one side to the other and dissected back. This brings us down to the muscles. As a rule the sterno-mastoid muscles can be pushed aside, but in some cases their division is necessary. The omo-hyoid, sterno-thyroid and sterno-hyoid muscles are cut between forceps near their upper portion. It is important that they be cut high so as to avoid injurying their nerve supply. The thyroid gland will now be seen.

Using the fingers as retractors, the muscles and tissues are forcibly retracted, giving the gland free exposure. The thin capsule of the gland is now incised and with a scalpel handle or some other blunt instrument, is separated back from the gland. It is important to stay within this capsule and thus avoid injury to the recurrent laryngeal nerve and the parathyroid bodies. The superior thyroid artery is now ligated well away from the gland so as to include its posterior branch. The gland may now be grasped with a goiter forcep and lifted up and inward in order that the inferior thyroid artery may be ligated. The thyroidea ima artery is now ligated. With a piece of soft gauze the capsule together and any loose connective tissue that might contain the parathyroid bodies, are pushed back and the lobe gently freed from its bed. The isthmus is now crushed and the lobe removed. The same is carried out on the opposite side when it is necessary to remove a part or all of the remaining lobe. All bleeding is controlled, and the muscles and fascia are carefully united with fine catgut.

In some cases of hyperthyroidism it is well to sponge the thyroid bed with Harrington's solution to prevent too rapid absorption of thyroid secretion that might have been squeezed out while removing the gland. In all cases of hyperthyroidism a drain is left in for two or three days to prevent acute hyperthyroidism. The drain is brought out through a stab wound below the line of incision. The skin is united with horsehair, and a gauze dressing applied. Ether seems to be the anesthetic of choice, unless there is some contraindication in which case novacain locally may be used. These patients are usually highly nervous and a general anesthetic skillfully given is to be preferred. After the patient is anesthetized the reversed Trendelenberg position is used to lessen the amount of anesthetic and to decrease hemorrhage. A hypodermatic injection of morphine gr. ¼ and atropine 1/150 gr., is given one-half hour before operation. This is important, as it lessens nervous excitement and thus enables the patient to withstand the operation with a greater degree of safety. The following case reports will show the results the writer has obtained in some of his cases upon whom operation was performed.

Case I.—Mrs. V. B. E., white, age 21. Married and has two children. Symptoms began during first pregnancy. There was hyperthrophy of the gland and all other symptoms of hyperthyroidism except exophthalmos, the pulse rate averaging about 120. Under ether anesthesia the right lobe of the thyroid was removed, and the blood supply ligated on the left side. This patient made a good recovery, with the exception of mild symptoms of tetany, coming on shortly after the operation. These symptoms disappeared in about a week and the patient is now in good health, having a pulse rate of 80.

Case II.—Miss J., white, age 19. Was in good health previous to the appearance of goiter about two years ago. There was marked enlargement of the gland, especially the right lobe, together with all the symptoms of hyperthyroidism. This patient would be confined to the bed at times with acute thyroid poisoning. Family history negative. Under ether anesthesia the entire right lobe was removed and the blood supply of the left lobe ligated. This patient made a rapid recovery and her health is much improved.

Case III.—Miss G., white, age 18, trained nurse. Other members of her family have suffered with goiter, the writer having operated on her sister one year before. Previous history shows her health to have been good until the development of hyperthyroidism at least one year prior to operation. This patient had all symptoms of hyperthyroidism except exophthalmos, her pulse rate averaging 120. She very frequently had spells of hoarseness, due to pressure. Under ether anesthesia the entire right lobe was removed and the blood supply ligated on the left side. This patient is now enjoying good health.

Case IV.—Referred by Dr. Newburn of Pritchard. Miss E., white, age 13. This was a case of cystic goiter. Under ether anesthesia the cysts on both sides were enucleated. This patient made a good recovery.

Case V.—Miss H., white, age 35. Had suffered from exophthalmic goiter for about four years. Had all the symptoms. The goiter was quite large. Under ether anesthesia the right lobe and part of the left lobe was removed. This patient comes from a goiter family. She made a good recovery.

Case VI.—Mrs. B., white, age 50. Had large cystic goiter. Under ether anesthesia the growth was removed. The chief symptoms in this case were deformity and pressure. The patient is now in good health.

Case VII.—Referred by Dr. Hail of Robertsdale, Ala. Miss G., white, age 14. This was the worst case of exophthalmic goiter that has ever come under my care. This patient comes from a goiter family. Has two aunts and two cousins who are suffering with goiter. This patient suffered a bad spell of typhoid fever one year previous to the appearance of goiter. The eyes of this patient had almost protruded from their sockets. She had a pulse rate of 160, together with all other symptoms of Graves' disease. This patient was admitted to the Mobile Infirmary August 15th, 1915. She was put to bed and treated medically for four weeks before operation. The remarkable thing in this case was the appearance of the gland. It was scarcely larger than normal. Under ether anesthesia one lobe and a part of the other lobe was removed. Convalescence was very slow, but the patient has gained about twenty pounds and is now enjoying good health.

Case VIII.—Miss D., white, age 19. Had all the symptoms of Graves' disease, the pulse rate being 120. This patient ran temperature from 100 to 100½. The exophthalmos was marked, and suffered a great deal with spells of sweating and intermittent diarrhea. Under ether anesthesia one lobe was removed and the other resected. The pulse rate in this case has come down to normal and the patient is now enjoying good health.

Case IX.—Mrs. M., white, age 44. Married, and has one child. A very marked case of Graves' disease. Tachycardia very pronounced and the patient very nervous. The gland was very large. Her grandmother and aunt both suffered with goiter. This patient had to be treated medically for a week prior to operation. Under ether anesthesia the goiter was removed and the patient allowed to get up on the seventh day. This patient is now enjoying good health.

Case X.—Mrs. T., white, age 28, married, and has two children. Exophthalmic goiter developed during first pregnancy. Family history negative. This patient suffered a great deal with digestive symptoms and headaches, together with palpitation and extreme nervousness. She had a pulse rate of 120. Exophthalmos was marked. Under ether anesthesia the goiter was removed and the patient made a good recovery. She is now well.

Case XI.—Mrs. B., white, age 32. Is married and has one child. Gives history of goiter and tuberculosis being in family. Had suffered with goiter about three years before coming under my care. Had all the symptoms of exophthalmic goiter. Under ether anesthesia the goiter was removed and the patient's health has been much better.

Case XII.—Negro woman, age 35, referred by Dr. Hail of Toulminville, Ala. This was a case of large cystic goiter. Under ether anesthesia cyst was enucleated from the gland. The patient made a good recovery.

Case XIII.—Miss G., white, age 17. Comes from a goiter family. Thyroid very much enlarged, together with all other symptoms of Graves' disease. Under ether anesthesia the goiter was removed. The patient is now in good health.

Case XIV.—Mrs. L., white, age 30, married, and has two children. Family history negative. This case presented a typical goiter heart. She gave a history of having suffered with heart trouble for a long time. All the symptoms of Graves' disease were present except exophthalmos. She had a pulse rate of 130. Under ether anesthesia the goiter was removed and after a slow convalescence the patient was restored to perfect health.

Case XV.—Miss P., white, age 22, of Guatemala, Central America. This case came to me from Guatemala suffering with exophthalmic goiter. The gland was very much enlarged, tachycardia pronounced, and the eyes greatly protruded. Intermittent diarrhea was an annoying symptom in this case. Pulse rate 140. She was treated a few days medically and then under ether anesthesia the goiter was removed. After a slow convalescence her health became much better, her pulse rate now being normal.

THE DETERMINATION OF PROGNOSIS DURING THE TREATMENT OF MUSCLE PARALYSIS DUE TO NERVE INJURY

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There is hardly anything more trying in the realm of practical medicine than the treatment of paralysis due to nerve injury. When treating a paralytic muscle, the patient himself asks daily whether he will ever be able to move his limb. Weeks and weeks, months and months pass by, and yet the much-desired end, namely active motion, is unattained. For any conscientious physician it is always uncomfortable to treat such patients for many months without knowing what the result may be. The difference between a modern physician and a medicine-man does not lie in the confidence which the modern physician has in his methods, the value of his art (I am sure that the medicine-man believes more in himself than does the scientific physician in himself) but the ability which the modern scientist has to foretell the future.

In the last few years I have had occasion to see quite a number of these nerve injuries, and while treating them personally for many months at a time, I have been able to make such observations as have guided me, and enabled me to make a favorable prognosis 6 to 8 months before the active motion was restored, or on the other hand, an unfavorable prognosis in other cases where subsequent events also justified it.

The signs for an unfavorable prognosis are fairly well known, but I have not found any note that deals with the changes in reaction when a severe case of nerve injury is on the road to recovery.

So far, only reaction of degeneration has been considered a measure of the severity of the case. Total reaction of degeneration involves:

1. Disappearance of active motion.
2. Disappearance of the response to faradic current.
3. The anode closing contraction. (The anode stronger than the kathode closing contraction, A C C > K C C)
4. The response to the galvanic current is not prompt; not as quick as lightning, but a slow and wormlike contraction.

These symptoms appear about two weeks after an injury or a disease of the nerve; the prognosis is, to say the least, doubtful, the case is severe.

Anything short of these four symptoms is called an impartial reaction of degeneration, and upon electrical examination the closer the approach to these four findings, the more hopeless the case.—Thus, first, in the mildest form of such paralysis active motion is lost, while the electrical reactions, faradic as well as galvanic, are normal; secondly, in less mild a form, the faradic current does not cause a reaction but KCC > ACC; thirdly, in cases of total reaction of degeneration there is not only no faradic reaction but also ACC > KCC; finally KCC none, ACC +.

In text-books we are taught the value of electric reaction as a measure of the severity of cases of paralysis due to nerve injury, but neither text-books nor articles on this subject state that the electrical reactions in and of themselves do not give us any information as regards the ultimate outcome.

As a matter of fact, if we find the total reaction of degeneration, this does not mean that the case is hopeless, and on the other hand a partial reaction does not necessarily signify that recovery is certain. Such information can be obtained only by observing the changes in the reaction; for instance, it is a very bad sign when a partial reaction becomes a total one, and vice versa.

By way of illustration I shall describe some of my own experiences in observing changes:

In a case of osteomyelitis of the right upper arm a resection of the musculo-spiral nerve (scar) was necessary. An autoplasty was done and the patient was sent to me about four weeks after the operation. There was total reaction of degeneration (drop wrist, no faradic reaction, ACC stronger than KCC, contractions wormlike) and typical anesthesia in the dorsal region between the thumb and index finger. The patient was immediately given daily electrical treatment and massage, and especial care was taken that only those muscles were treated that were paralyzed, and that no contraction of the flexors was elicited. The hand was immobilized in extension over night to prevent overextension. For about three months the muscles, though not used or supplied with nerve impulses, did not atrophy. This was the first favorable sign, since electrical stimulation cannot fully replace nerve supply and ultimately will not prevent total degeneration. The fact that electrical stimulation can replace the regular nerve supply to some extent, makes me doubt that the degeneration of muscle fibers that are deprived of their innervation is due to any special trophic disturbance.

If during treatment one notices that the reaction of the muscle becomes weaker and its bulk smaller one stands face to face with total loss of that muscle. In this connection I wish to utter a word of warning: It sometimes happens that in the course of an operation, especially on the forearm or leg, a nerve fiber is cut which supplies a certain muscle or part of this muscle; degeneration of the affected part with all its consequences results. In such cases I have noticed that physicians are not unlikely to make a great mistake; because, whereas in the beginning of cases with marked degeneration, one can easily see where the trouble lies, by the wormlike contraction, later when the muscle gets weaker and does not react sufficiently strongly, an inexperienced observer is prone to take the normal reaction of the normal muscle for the reaction of the degenerated and make a mistaken good prognosis.

It is hardly necessary to say that the faradic current shonld not even be tried by the inexperienced, as it is very misleading in their hands. At various times, I have seen examinations with faradic current, when the muscles were pronounced normal, because the action of neighboring muscles were taken for those of the affected.

As long as the atrophy of the paralyzed muscle does not progress, and especially as long as the reaction grows stronger, we may be hopeful. The second favorable sign is the increase in the rate of the wave of contraction even though it be still slow and wormlike. I am quite convinced that the exact measurement of the rate of the contraction wave would be of material assistance in prognosis, and I regret that I have had no opportunity to make such measurements.

On one occasion, I found that upon treating a patient in the usual way, as I thought, I could unexpectedly elicit no contraction with the current which was theretofore always effective. Upon investigation I found that I had used the anode instead of the kathode. Following up the experience, I discovered that while in the beginning of the treatment ACC was much stronger than KCC, I could now hardly elicit a contraction with the anode at all. Such a change toward the normal is of the greatest importance.

In the course of the treatment of a woman, suffering from a peculiar affection that had caused paralysis of various muscles in both legs, I had the following gratifying experience. The right extremity had improved so much that the motion of the whole foot and of the toes had returned. The electrical examination of both limbs showed that, in the right leg KCC >ACC, whereas in the left KCC< ACC. Thereupon the patient had to leave town and I received regular reports of the results of the continued treatment. The reports reiterate that the left foot showed no signs of improvement after two months. I asked the nurse, who was unaware of the object of my inquiry, what were the electrical reactions. When she reported that in the case of both legs KCC > ACC I made a good prognosis and four weeks later received a letter announcing that the toes of the left foot were moving.

Once this stage is reached one can safely make a very favorable prognosis, but it may take two or three months before active motion begins. It is of great importance to use a certain ingenuity to elicit active movements: one must, of course, make motion as easy as possible. For instance the case of drop-wrist, when with palm turned downward, the extensors are too weak to lift the hand, they may yet be strong enough to do so with the palm turned up, for then the weight of the hand favors the extension. Later on the forearm may be raised more and more until it reaches a vertical position; in such a position the muscles are neither hindered nor helped by the weight.

Active motion comes before the muscles respond to the faradic current, and as it evidently takes a very long time for that response, it should not cause despair if the faradic current fails to call forth a reaction.

Such is the course of events which I have observed repeatedly and without fail; and I trust that a description of these events may relieve the anxiety of some of my colleagues, whose painful duty it is to attend to these, by no means rare, cases.

161 WEST 86TH STREET.

PYELOGRAPHY.

In intermittent hydronephrosis due to the temporary kinking of the ureter of a floating kidney (showing clinically the symptoms of a Ditel's crisis), the filling of the renal pelvis and ureter with collargol is an excellent method of reproducing the colicky pain experienced by the patient during the attacks, and also of demonstrating the degree of dilatation of the renal pelvis.—DANIEL N. EISENDRATH in *The Journal of the Michigan State Medical Society.*

MOSETIG-MOORHOF'S BONE PLUG FOR REPLACING BONE TISSUE.

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Cleveland, Ohio.

The closing of bone defects, after such destructive diseases as osteomyelitis and bone tuberculosis, has for many years been a source of much thought and worry to the surgeon.

Such cavities have been filled with pieces of sponge, with the expectation that the sponge would serve as the basis of growth for the granulation tissue, which should fill the defect and organize about the foreign body. This method has properly been abandoned. Another procedure has been to sterilize as far as possible such a cavity, then fill it with blood clot, suture the skin and trust to the organization of the clot. This also has failed to accomplish the purpose in the majority of cases. Attempts have been made to line the walls of the cavity with skin, but this has only met with mediocre success. Another method, that of filling the cavity with Mosetig-Moorhof's bone plug, seems to offer the best chance of successfully repairing a bone defect by means of a foreign substance.

This bone-plug consists of 60 parts of the finest powdered iodoform and 40 parts each of the oil of sesami and spermaceti, which at the ordinary room temperature forms a hard yellow mass. At 50° C. the mass becomes liquified, and if well shaken forms a perfect emulsion.

The preparation of the bone cavity itself is the most important part of the technic. The operator is required to exercise the most painstaking care and patience in rendering the cavity absolutely aseptic and dry. Every particle of diseased bone must be removed, until the walls of the cavity extend well into the area of healthy bone tissue. All hemorrhage must be completely checked. This can generally be accomplished by gauze packing, or by swabbing with hydrogen peroxide or epinephrin. Mosetig-Moorhof recommended the use of hot sterilized air to render the cavity absolutely dry. I have found this unnecessary, as I have been able to sufficiently dry the cavity by means of gauze sponging. The bone plug is then placed in the cavity, in its liquid form, exercising care that every portion of the cavity is completely filled, depending upon the force of gravity to fill all cracks and crevices.

The soft parts are then sutured and, if there are any fistulous openings, these are curretted and left as drainage channels for the escape of lymph. If there are no fistulae present, the stitches are placed far enough apart to allow for a small amount of drainage.

The reconstruction of the destroyed bone proceeds according to Mosetig-Moorhof as follows: First, there is a formation of fibrous connective tissue, which as it advances from the periphery, forces the bone plug little by little out of the cavity, and if there is no outlet, this same connective tissue by means of pressure, causes the gradual absorbtion of the bone plug. That this absorbtion takes place has been proven by demonstrating iodoform in the urine. The process is completed by a deposit of calcium salts in this newly formed connective tissue, and can be minutely followed with the roentgen ray. At first the entire cavity is seen to be filled with bone-plug, which is represented on the skiagraph by a dark shadow. After a few months this shadow becomes lighter, the light areas corresponding to the connective tissue formation. This process continues until the new bone is completely formed by the calcium salts deposits, when the location of the former cavity is no longer discernible on the skiagraph.

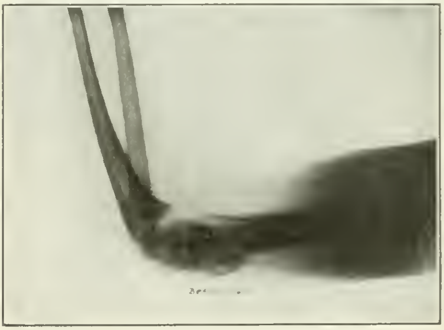

Fig. 1.

That this method can not be used in acute cases of osteomyelitis, is self-evident, as it is impossible to render such cavities aseptic. It finds its application in the more chronic bone diseases, with fistulous openings, and in which the new granulations are constantly undergoing septic degeneration, chronic cases of osteomyelitis, and tuberculosis of joints, especially those termed by Mosetig as fungi articuli, in which it is necessary to remove every portion of the diseased tissue, just as in cancer, if a recurrence is to be prevented. Another class of cases in which the bone plug has proved useful, is in the severe empyemas of the antrum of Highmore. The following cases illustrate the usual results obtained by this method of closing bone cavities.

Case I is that of a female aged 33, who had a typical fungus articuli of the left knee. The joint was enlarged and showed the usual fusiform swelling of a tuberculous joint. There were three fistulous openings, each discharging pus. Conservative treatment was out of the question. The joint was opened, allowing a large amount of pus to escape. Every portion of tuberculous tissue was carefully removed, necessitating the removal of the entire joint capsule. The cartilages were also resected. Then a thin layer of bone, about one-quarter of an inch in thickness, was removed with a bow saw from the upper end of the tibia and the lower end of the femur. The carious bone was then curretted and chiseled out of the articular ends of both bones, leaving a cavity in the femur two and one-half inches in length and one inch in breadth. The cavity in the tibia being about half the size of that in the femur. Both defects were filled with the iodoform bone plug, the femur and tibia were placed in apposition and the soft tissues were sutured. The fistulæ were curretted, and allowed to remain for drainage. A posterior Volkmann splint was applied, which remained in position for two months. A firm bony ankylosis with complete closure of the fistulæ resulted, leaving about one-half inch of shortening. The operation was performed about five years ago and up to a month ago, when the patient was last seen by the writer, there was no recurrence.

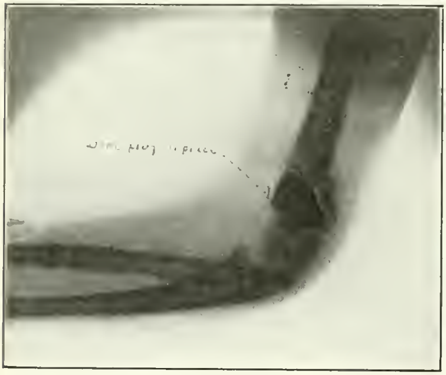

Fig. 2.

Case II. A boy, aged 9, received a compound fracture of the left elbow, both condyles of the humerus being torn off. The upper fragment penetrated the skin. A temporary splint was applied, and rigid asepsis was employed in an effort to prevent infection. But in spite of all precautions, a severe infection developed accompanied by high fever and chills. The infection was finally controlled by an autogenous vaccine. After the systemic symptoms had subsided, and the discharge of pus greatly lessened, there remained a chronic suppurative osteomyelitis. A skiagraph showed a large sequestrum. The soft parts covering the external condyle consisted of unhealthy granulation tissue. This was removed, the sequestrum taken out, and all the necrotic bone curretted or chiseled away. This left a large round cavity extending well into the shaft of the humerus. The cavity was then carefully dried and the bone plug poured in. As there was not enough skin to close the wound, the plug remained slightly exposed. Immediately after the operation a prophylactic injection of vaccine was given. At each dressing small amounts of the plug which had been pushed out of the cavity were found on the gauze. At no time after the operation was there any pus. In about three months the entire cavity was closed in with healthy skin covering it. The patient had a perfectly functionating arm.

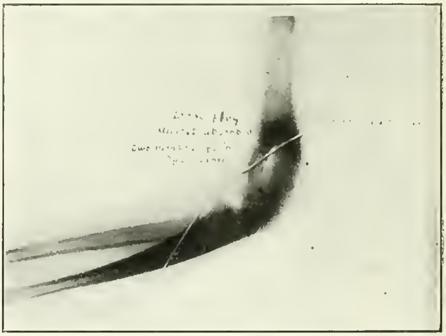

Fig. 3.

Case III. Male, aged 40. Chronic osteomyelitis of the humerus, following a bullet wound of its lower third. The x-ray examination showed a large sequestrum involving a little more than half the humerus shaft. This was removed at the operation and the large cavity which remained filled with bone plug. The fistulæ were allowed to remain patent for lymph drainage. The wound healed *per primam* except for a small fistula which had to be curretted several times before it closed permanently. In less than sixteen weeks, the patient had complete use of his arm.

The above cases are typical of the results obtained by the use of this method, and although I have used it in a number of other cases, with uniformly good results, I shall not take the space to report them here. Suffice it to say, that in my opinion, this method has not received the consideration from the American surgical profession, that results obtained from its use warrant, and I feel confident that if it were more frequently used, in proper cases, it would be found of inestimable value.

NOTES ON THE AFTER-TREATMENT OF SUPPURATIVE APPENDICITIS.

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The mortality in cases of appendicitis is much larger than it should be, which I believe is due, in a very great measure, to the lack of proper after-care. We all know that the death rate after operation for so-called "catarrhal appendicitis" is almost nil; also in the acute cases, where diagnosis has been made early in the disease operation done before the disease has progressed to any extent. The surgeons of this country and abroad have been unjustly credited with too many deaths, which were largely due to two important factors: First, that a diagnosis was not made early; and, second, to the fatal use of the ice-bag as a means of cure in the early stages of the disease.

The ice-bag is one of the most dangerous agents we have to contend with in this class of cases, when used as a cure; it will relieve pain, but it does not stop the progress of the disease. Unfortunately, among the laity, and even among some of the members of the medical profession, the idea is prevalent that cold as applied by the ice-bag will retard the infection in such a way as to bring about almost immediate resolution. Cases in which ice-caps have been used, and the disease has been allowed to go on to suppurating and gangrenous stage, are the ones that are rushed into the hospital for operation late at night or in the small hours of the morning and which try the patience of the surgeon to almost the last degree, for so many of them look almost hopeless. It is to this class of cases I wish to call attention.

The preparation I have followed for the past few years is very simple: the abdomen is shaved and washed with alcohol and ether. Morphine, gr. ¼ and atropine gr. 1/200, are given forty-five minutes to one hour before operation. No attempt is made to move the bowels: the patient is taken to the operating room more or less under the influence of the morphine and is anesthetized on the operating table with ether by the drop method. As soon as the patient is unconscious, the abdomen is again prepared with alcohol, ether and iodine. A large low McBurney incision is made in the majority of cases or the median line incision: the appendix is isolated and crushed near its base and ligated with a number 0 catgut. A purse-string suture of very fine silk or catgut is passed around the base of the appendix in the cecum—the appendix is removed by a knife, the stump is cauterized with pure phenol, followed by alcohol and inverted and the purse-string suture is drawn tight; two or three sutures (gas sutures) are taken over the stump and if possible the meso-appendix is tied over the cecum.

This procedure is conducted rapidly and gently, with no attempt to explore the abdomen and with just as little handling of the bowels as possible. Two or three drains are placed in position, depending upon the amount of pus present, one going down into the abscess cavity near the stump of the appendix and one down into the pelvis. The drains are of soft rubber tubing with a wick of gauze inside, or plain gauze covered with rubber tissue. The wound is then partially closed, using chromicized catgut for the peritoneum. Two or three silkworm-gut sutures are passed through the facia and skin later on, and tied over scissors or some other instrument to prevent pressure necrosis of the skin. The skin is closed with chromicized catgut and interrupted silkworm-gut, or with clips.

Wherever it is possible, all free pus is sponged dry and at no time during the operation is any irrigation used. As soon as the patient returns to his room, eight ounces of saline solution are administered per rectum and he is placed in the true Fowler position. And here is where so many fail to get the desired result, for just elevating the head of the bed will not suffice: the patient should be in a comfortable sitting position, and for this purpose a Fowler frame is placed on the bed and may be adjusted to any position.

The saline solution per rectum is repeated in six ounce doses every two hours for three doses, then four ounces every three hours for the next ten or twelve hours. These small repeated doses are given instead of the Murphy drip, as it has been my experience that few nurses give the latter properly.

The first dressing is done forty-eight hours after the operation, or before if the dressings are soiled in any way. These dressings are changed morning and night for the first few days or as long as indicated. At the time of the first or second dressing the drainage tubes are withdrawn a little to prevent pressure on or necrosis of any loop of the bowel that might come in contact with them. As a rule on or about the fifth day it is safe to remove the pelvic drain, if one has been used, and replace it with a small cigarette drain or a strip of gauze; the other drain is removed in the same way about two or three days later.

It is advisable for the surgeon to dress these cases himself or supervise the dressing of them for the first four or five days, rather than leave them entirely to the care of an inexperienced interne, and too much stress cannot be laid upon this fact, as it has much to do with the comfort and recovery of the patient. These patients are not given anything by mouth, not even water, for twenty-four hours; at the end of that time they are allowed sips of water and then, gradually, albumen water, chicken broth and buttermilk; we exclude the use of beef-broth and raw milk, for it has been my experience that they invariably produce more or less gas. There is always more or less intestinal stasis in this class of cases, and the patients that are unable to expel any gas and are not relieved by the use of the rectal tube, are given eserin sulphate gr. 1/50 and strychnine sulphate gr. 1/30 hypodermatically every four hours, and with low soapsuds enemas, this is continued until peristalsis is resumed.

In many cases it is necessary to use morphine during the first twenty-four hours and where there are marked nausea and vomiting or any signs of dilatation of the stomach, I find the stomach tube will aid very materially.

The cardinal points in the treatment of septic cases of appendicitis are: as little handling of the bowels as possible, free drainage, true Fowler position following operation, supervision of the first four or five dressings, morphine if needed, and the use of the stomach tube for dilatation.

810 Peach Street.

Sacral Anesthesia in Bladder Surgery.

There have been no bad results or fatalities reported following the use of epidural injections, sacral anesthesia or caudal analgesia.

The chief advantages of caudal analgesia are: Extreme safety and absence of unpleasant or dangerous after-effects, as nausea, vomiting, pneumonia, etc. It has enabled us to operate on a class of patients in whom the risk of using general anesthesia would have been too great.

We have been so well impressed with the success of the method during six months' use of it that we believe it is destined to change largely the surgery of the pelvis, especially for the aged, feeble and decrepit. Prostatectomy is at once relieved of one of its greatest objections. The patient goes through the operation without shock, without nausea or vomiting, without menace to heart or lungs, and may be as comfortable after its performance as he has been before it.

The term analgesia as applied to this procedure has been used in preference to anesthesia. In many cases tactile sensation is not completely lost, though pain in the same area is entirely abolished.—Bransford Lewis and Leo Bartels in *The Lancet-Clinic.*

VAGINAL AND ABDOMINAL CESARIAN SECTION.*

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Like the mountain climber who rests from time to time to look backward over the road whence he came, so, too, there are times when the surgeon ought to look backward to see what progress has been made during a given period, and whether such progress has been worth the energy and labor expended. With this in mind I think it will be of interest to look backward over the most important field in obstetrics, namely, the evolution and achievement in abdominal as well as vaginal Cesarian section; particularly inasmuch as the progress made along these lines during the past twenty to thirty years has been so marked as to almost overshadow everything that had been accomplished previously.

Abdominal Cesarian Section: During the latter seventies of the nineteenth century an operation devised by Porro, which still bears his name, was in common use. This operation consisted in the amputation of the uterus after every abdominal Cesarian section, for the reason that in practically all of the cases in which abdominal section was performed, the patients died of subsequent sepsis. This shows at a glance just what results had been obtained up to that time. Although Porro's operation marked some degree of progress as far as the saving of the mother's life was concerned, such a mutilating operation could not satisfy surgery for any length of time.

It was in the early eighties that Saenger devised a method for abdominal Cesarian section which was another great step in advance. He improved the technic by advocating a thorough suture of the uterus in different layers, which ended in a typical Lembert sero-serous suture. This improved technic, in combination with Lister's ideas of antisepsis and asepsis, marked a new era in this field and made Porro's amputation of the uterus after an abdominal Cesarian section superfluous. From that time on the classical Cesarian section was performed, more or less modified, along the lines which Saenger had laid down and gave some splendid results in the hands of many operators. For a number of years there was no change in the technic, and in cases where infection was present the Cesarian section was not performed, the living child, as a rule, being perforated and extracted *per vias naturalis.*

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* Read before the Harlem Medical Society, December, 1915.

Vaginal Cesarian Section: A marked change came about when Duehrssen made public in 1895 his operation which goes under the name of vaginal Cesarian section. He had worked out a method which he described as deep cervical incisions and finally developed it into the above-mentioned operation. It consists mainly in the opening up of the womb far below no matter at what time during the pregnancy the operation has to be performed. This operation, which aims at the saving of the mother's as well as the child's life, is naturally *not practicable* in all *cases* of *small or flat pelvis,* or in all cases where there are *tumors,* such as myoma of the uterus, or where large tumors of the ovaries are present.

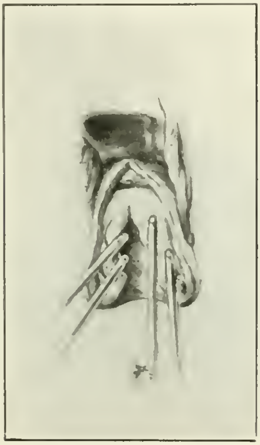

Fig. 1.—Vaginal Cesarean Section. Cervix cut open (from Döderlein-Kronig "Operative Gynakologie.")

Before going any further I would like to give a few notes as to the technic of the now classical vaginal Cesarian section, also described as colpohysterotomy.

Technic: The patient is put into the lithotomy position. In a primipara at full term it might be advisable to perform a deep episiotomy in order to get free access to the cervix. Specula are now introduced and the cervix is grasped with two volsella on both sides, which are replaced by two guide sutures, and then the vaginal mucosa of the posterior lip is incised along the axis of the uterus up to the peritoneum, which is pushed further up. In the same manner the vaginal mucosa of the anterior lip is split open, and the bladder pushed upward out of the field of operation. Through deep incisions the anterior and posterior cervical lips are now incised for about two and a half inches, which gives ample room for introducing the whole hand and extracting the child. In order to find easily the upper end of both incisions after the extraction, it is always wise to put in guide sutures before extracting the child. It is easy to find the uppermost end of the incision wherefrom one starts to close up the wound. It is always wise to remove the placenta manually in order not to lose any further time and, according to Duehrssen, to pack the uterus with iodoformized gauze.

In order to facilitate the incision into the cervical lips, Duehrrsen has described a new method which he termed "Metreurynterschnitt," which consists of introducing a metreurynter into the uterus, filling the bag with some antiseptic solution, and then pulling it down as far as possible. This naturally brings down the cervix, which is then incised on the bag. When the latter comes out easily the operation is completed and the child can be extracted.

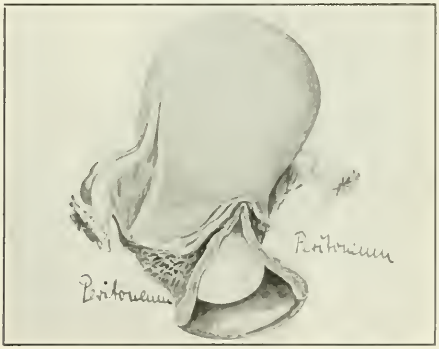

Fig. 2.—Vaginal Cesarean Section Anterior cervical lip cut entirely open. Intact membranes can be seen (from De Lee's "Obstetrics."

Bumm and Doederlein advocate the incision of the anterior lip only, which they say is sufficient to extract even a child at full term.

In the accompanying pictures (1 and 2) is shown only the anterior incision, which is done nowadays in most of the cases (Bumm, Doederlein and others). Instead of making a longitudinal incision into the anterior vaginal wall it has become the habit of late to make instead a — incision, which gives freer access and a wider field for the operation.

The advantages of vaginal Cesarian section are chiefly that it is possible at any time during pregnancy, or at full term, to open up the uterus from below in any emergency in a clean-cut surgical way, as against the older methods such as accouchement forcé and version after Braxton Hicks.

As a danger of this method it was pointed out that the bladder might be injured, but this can be easily avoided through proper technic. As far as subsequent pregnancies and labors are concerned, no untoward consequences have appeared in the literature.

For over twelve years Saenger's method of the classical abdominal Cesarian section and Duerhssen's vaginal method each have had their wide field of usefulness, the latter in all the cases above stated, and Saenger's method in all cases of narrow pelvis or other obstructions of the birth canal, provided there was no infection present. But because there were some cases in which those two modes of operation were not satisfactory, viz., those cases of flat or narrow pelvis in which there is some infection present and in which neither vaginal nor classical Cesarian section could be performed with any safety for mother or child, and as the trend of modern obstetrics is toward the saving of both mother and child, it was evident that some method had to be devised in which an abdominal Cesarian section might be performed in contracted pelvis where an infection is present.

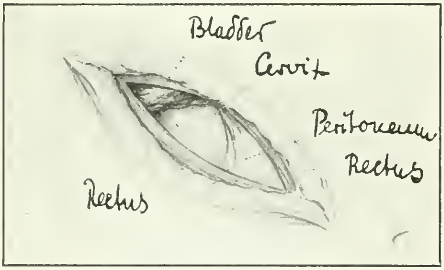

Fig 3.—Extraperitoneal Cervical Cesarean Section. (Döderlein.) Showing topography. (This and the following illustrations are from Döderlein-Kroenig's "Operative Gynäkologie.)

It was in 1907 that Frank of Cologne first described his method of suprasymphyseal abdominal Cesarian section which was promptly adopted by most obstetricians. As a forerunner of Frank, the American, Physick, might be mentioned who, as far back as 1824, proposed that the approach to the uterus be made extraperitoneally. This marked a new era in operative obstetrics insofar as it attempts to open up the womb from above at its lowest accessible point, without opening the peritoneal cavity, and it is readily seen that this idea, if actually executed, would eliminate the possible infection of the abdominal cavity with its resulting peritonitis.

Frank's method provided that through a *transverse* incision the operator should try to find his way below the peritoneal fold between the peritoneum and bladder, but owing to the difficulties experienced during his first operations, he later advocated the opening up of the peritoneal cavity, loosening the peritoneum of the uterus and sewing it together with the parietal peritoneum, thus *closing* the *peritoneal cavity immediately* and *before* opening the uterine cavity. He then incised the lowest accessible point of the womb, also transversely, and extracted the child.

This method was later improved by Kroenig, but the idea remained practically the same. (Figs. 5, 6 and 7.)

It was for Latzko, Sellheim and Doederlein to elaborate this method, following Frank's original idea. Thus we have *since 1907 two* new and *distinct methods of abdominal Cesarian section*—the *transperitoneal* (Frank-Kroenig) and the *extraperitoneal* (Latzko, Sellheim and Doederlein). (Figs. 3 and 4.)

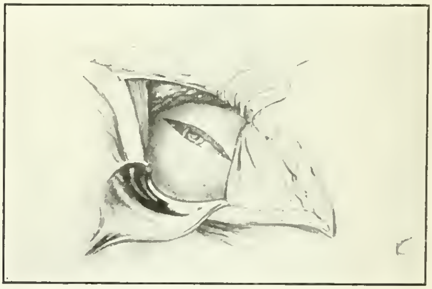

Fig. 4.—Same as Fig. 3, with incision made into uterus.

The methods of Latzko and Doederlein are about the same. The operation is performed in the Trendelenburg position. An incision is made from the symphysis up to about five fingers' width below the umbilicus. The idea is then to find one's way below the fold of the peritoneum, and along the left side of the bladder where, as Latzko has shown, there is the easiest access to the uterus without injuring the peritoneum. The incision in the uterus is made as small as possible and the child is then extracted with the aid of a small forceps. The uterus is sewed up in the typical way and the abdomen is closed.

I will admit that this type of operation is not quite as easy as it sounds and in this country, up to 1914, there were only eight cases collected by Nicholson,—seven operations performed by Hirst and one by Kelly. I fully agree with Nicholson when he states in some of his conclusions:

"The extraperitoneal suprasymphyseal Cesarian section is an addition to the obstetric armamentarium.

"Its chief indication is the 'neglected case' or one that is mildly infected.

"The transperitoneal technic is to be preferred to the true extraperitoneal because of the ease of performance, less interference with the bladder and the avoidance of contamination of the retroperitoneal and preperitoneal tissue areas.

"Subsequent pregnancy and labor are usually not influenced adversely.

"Repetition of the procedure may be more difficult, and in some cases it may be impossible."

Eisenreich reports one hundred and forty-five cases of extraperitoneal Cesarian section performed at the University Clinic at Munich from 1908 until 1915. It was possible to operate one hundred and thirty-seven times extraperitoneally. Of those one hundred and thirty-seven cases extraperitoneally operated upon, nine died, which gives a mortality of 3.7 per cent. Of the one hundred and thirty-seven children, one hundred and twenty-six were living; among the eleven dead children were three that were not viable; the fourth child was delivered after dry labor and in transverse position; the fifth died apparently because of the long duration of the operation; two children died without the cause being established. In twenty-two cases there subsequent labor was observed; in eighteen of these cases the section had to be repeated; in seven of these eighteen cases the second Cesarian section could be done again extraperitoneally; in the other cases the transperitoneal method was adopted. It would therefore seem that with proper technic the extraperitoneal as well as the transperitoneal method have come to stay and are surely useful in selected cases.

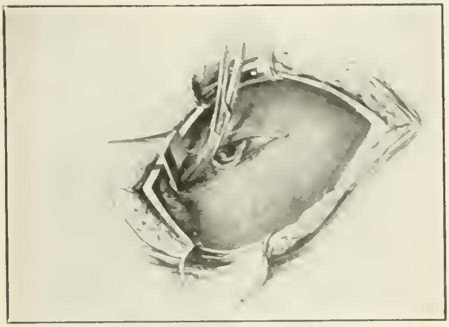

Fig. 5.—Transperitoneal Cervical Cesarean Section. (Kronig.) (Incision made in lowest accessible point in uterus.)

Use of Pituitrin in all Cesarian Operations. Before turning now to a discussion of the indications and contra-indications to these different methods, I would like to point out one rather important aid in their technic, viz., the *use of pituitrin* in *all cases* of *vaginal* as well as *abdominal Cesarian section.* In Dr. Brodhead's service at the Harlem Hospital, we have adopted the following method in all operations of Cesarian section: At the beginning of the operation the patient receives one c.c of pituitrin subcutaneously. This enables the operation to proceed practically bloodlessly, and one is really surprised to see to what extent the uterus contracts after, and even before, the child is extracted. In a case of eclampsia of the worst type in the fifth month upon which I had occasion to operate a few weeks ago, and in which I performed a vaginal Cesarian section in this way, I operated so to speak, bloodlessly. I would therefore advise the use of pituitrin in all cases of Cesarian section.

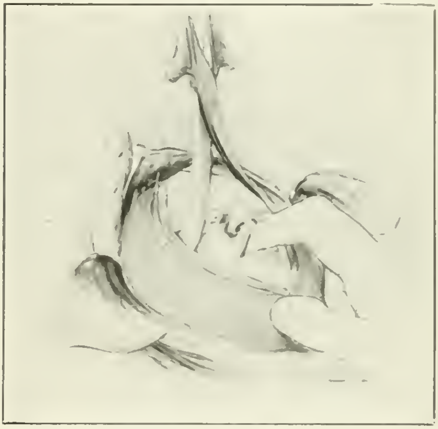

Fig. 6.—Transperitoneal Cervical Cesarean Section. (Kronig.) Extraction with specially constructed small forceps.

It is not absolutely necessary for pains to have set in before proceeding with this operation, indeed, at the present time we perform abdominal Cesarian section in cases in which no pains whatsoever are present.

Indications: It might be said in a general way that the vaginal section is advisable in all cases in which the cervix is still closed and indication for rapid delivery arises. The field for this operation is rather large, as it comprises all acute complications on the part of mother or child up to about the seventh month of pregnancy, such as eclampsia, premature separation of placenta, pernicious vomiting, pulmonary edema, heart disease and asphyxia in utero. In former years there were a number of obstetricians who advocated this operation in cases of placenta previa. This indication, however, has been abandoned by practically everyone because in those cases we usually perform the classical abdominal Cesarian section, provided, of course, that there is no infection present.

Eclampsia: One of the most important conditions with which we have to deal is eclampsia, not only at full term, but also during pregnancy. Although it is possible to perform the vaginal Cesarian section even at full term we, at Dr. Brodhead's service at the Harlem Hospital, have decided to perform the vaginal Cesarian section for eclampsia only up to the seventh or eighth month, and after that time the abdominal Cesarian section, because we know that with this kind of treatment the mortality, which was up to a few years ago forty-eight per cent., has been brought down to about twenty-five per cent. We furthermore *regard* all cases of *eclampsia* as *requiring* IMMEDIATE and *not conservative treatment,* reasoning that it would be wrong to inject more poisons into a body which already is poisoned. We do not believe in giving the patient ethyl chloride, morphine, etc., for quieting purposes. By doing so we surely do not remove the cause of eclampsia, which is not only a diseased kidney, but poisons which are produced in the placenta, and the logical deduction from this is that it is advisable to remove the placenta and naturally, the child, as soon as eclamptic seizures are diagnosed. In this respect, we are of one opinion with one of our foremost American obstetricians and gynecologists, Reuben Peterson. As I consider some of the conclusions of his splendid paper of great importance, I might cite some of them here verbatim to confirm what I stated above.

(a) "In a large series of cases of eclampsia, prompt delivery gave a maternal mortality of 15.9 per cent. as compared with a maternal mortality of 28.9 per cent. where the delivery was long delayed."

(b) "Where the uterus is emptied immediately, or very soon after the onset of the first convulsion, the maternal mortality is still lower."

(c) "Since 1900 the maternal mortality is lower by 4 per cent. after the radical opposed to the conservative treatment of the complication."

(d) "Therefore the treatment of ante-partum eclampsia should consist of emptying the uterus as quickly as possible after the onset of the first convulsion."

(e) "The operative procedure which will empty the uterus the quickest with the minimum trauma and shock to the eclamptic mother and child should be selected."

Placenta Previa: Up to a few years ago the mortality of children as well as mothers in cases of placenta previa was extremely high. This was due to the fact that in most of the cases too much time was lost with preparatory operations such as version, tamponing, etc. The vaginal Cesarian section was not only advocated by some European obstetricians, but was also taken up by a number of Americans. The results, as a whole, however, were not such as to recommend its use. It would therefore seem advisable in all cases of placenta previa centralis in which no infection is present and only one pronounced hemorrhage has taken place to perform either a classical or extraperitoneal Cesarian section. There are a number of cases on record in which the mother's as well as the child's life has been saved by such procedure. It is surely the simplest, and under aseptic precautions the safest method of dealing with this treacherous and dangerous condition. As far as abdominal Cesarian section in placenta previa centralis is concerned, Davis of the New York Lying-In Hospital is also a great advocate of this kind of treatment. This, however, applies only to cases of central placenta previa and not to cases of marginal placenta previa in which we might still get on with version and gradual extraction.

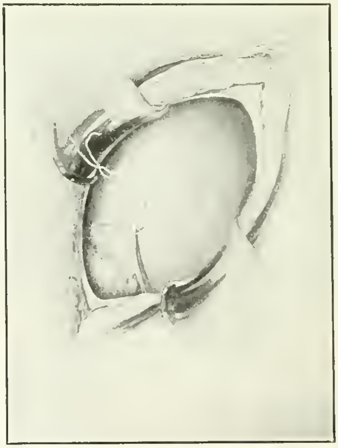

Fig. 7.—Transperitoneal Cervical Cesarean Section. (Krönig.) Bladder fastened to uterus so as to cover uterine incision.

In 1912 White collected one hundred and sixteen cases of abdominal Cesarian section for placenta previa. Ten women died—a mortality of 8.6 per cent. Furthermore, his statistics show a mortality of 10 per cent. of all the viable children. Considering the high mortality of the mothers among non-operative cases, these figures would certainly favor abdominal Cesarian section regardless of the method employed, and it would seem as though this procedure has come to stay as a rational method in the treatment of placenta previa centralis.

Another rather rare occurrence which might call for an abdominal Cesarian section is premature separation of the placenta, the dangers of which may equal that of placenta previa centralis.

It is not within the scope of this paper to enumerate all the rare occurrences which might call for abdominal Cesarian section. I wish only to say a few words about the cases where heart complications might call for immediate termination of the pregnancy, as, for instance, in cases of mitral insufficiency with stenosis. In such cases, however, the individual condition must govern the decision of the operator. Both the vaginal and abdominal sections have their advantages in these cases; the former can be done without narcosis or with slight gas narcosis, while the latter is the quicker method. In certain cases large myomata, as well as ovarian cysts, may be considered indications for abdominal Cesarian section, that is, in those cases in which they form rigid and insurmountable obstacles to normal delivery. In this connection may be mentioned advanced carcinoma of the cervix, total extirpation of the entire organ following the abdominal section. In contradiction to Duehrssen, I am not of the opinion that carcinoma of the cervix would ever be an indication for vaginal Cesarian section, inasmuch as profuse hemorrhage might be encountered in cutting through the diseased tissue. In addition to this, extraction of the head might be attended with great difficulty, the carcinomatous tissue being rather inelastic and unpliable. I recollect one case in which it was impossible to extract the after-coming head and decapitation was done and later abdominal total extirpation of the entire uterus containing the head.

At the Harlem Hospital, from April, 1914, up to January, 1916, we have performed the vaginal Cesarian section in fourteen cases and the abdominal Cesarian section in eleven cases. The vaginal Cesarian section was performed nine times for eclampsia, three times for toxemia of pregnancy, once for accidental hemorrhage (premature separation of placenta), and once for a missed abortion of three months which was carried about five months. We had five deaths, not due, however, to any operative interference but to the extremely serious eclamptic condition of the patients. As the Harlem Hospital is an ambulance city hospital, we naturally receive a large number of the most desperate cases. These five fatal cases belonged to this class and the vaginal Cesarian section was done, although we knew there was very little prospect of success. One of these deaths occurring during the fifth month of pregnancy was in a case of marked toxemia. In all the other cases the mothers made an uneventful recovery and we never found any pathological symptoms attributable to the operation.

Of the children, three died before the operation was commenced and altogether six were not viable, the operations being performed during the fourth to the seventh month.

Concerning the eleven cases of abdominal Cesarian section I would like to state that in all cases the typical classical section was done, in seven cases for flat or contracted pelvis, in two cases for eclampsia beyond the seventh month of pregnancy, and twice for placenta previa centralis. All of the patients, except two, made uneventful recoveries. Of these two, one died of empyema and general sepsis due to probable infection prior to the operation and the other died from severe eclampsia which continued after the operation. This patient died a few hours after the operation and her child was still-born. As I stated before, in all the other cases the mothers as well as children left the hospital in good condition.

I hope that I have accomplished in the foregoing remarks what I set out to do, that is, to show that the new era of surgical obstetrics has brought forth different distinct methods by which it is possible to save mother as well as child in cases in which either or both of them might otherwise be lost.

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A COLLECTIVE STUDY OF 2,000 CASES OF "TWILIGHT SLEEP." *

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It is now one year since I presented a preliminary report on the use of scopolamine in obstetrics, following the technic described by Gauss. In that report I state: "Judging from our experience and observation, we feel that this method of treatment should be given a fair trial. It is only a varied experience by competent men that will tend to settle this extremely interesting subject. It is the duty of the medical profession to set the public aright on this most important question. We must approach this subject from both a medical and a humane aspect. If pain can be relieved, it is the duty of the physician to do so, and no effort should be spared to accomplish it."

The demand made by women of all classes for this form of treatment made it possible to make further observations and to apply this treatment not only to hospital ward cases, but also to a great number of women of a higher social stratum.

As our experiences accumulated, we soon discovered that this form of treatment is best carried out in primiparae, or in multiparae in whom we have reason to suspect a tedious labor, and that it has no place in short labors. This, together with the fact that both mother and child require most careful watching, I pointed out very strongly at the February meeting of the section of Obstetrics of the New York Academy of Medicine.

In April I had the privilege of reporting my experience based upon a study of 300 cases at the annual meeting of the New York State Medical Society. I then stated, "In our enthusiasm we have overlooked the most essential fact in the entire procedure, namely, that 'twilight sleep' and painless labor are not synonymous, and that in a large number of cases pain is actually influenced but little. Furthermore the degree of pain bears no relation to amnesia."

We, as obstetricians, are now confronted with the problem of deciding, scientifically, whether a patient, manifesting the usual signs of pains during labor, even though she has no recollection of it subsequently, is actually suffering, or whether these are manifestations of pain, transient in character, and leaving no permanent impression. Again, we must decide whether we are to judge the intrinsic value of this form of treatment from the standpoint of analgesia or that of amnesia.

Are we, as physicians, administering this form of treatment, seeing these patients give expressions of pain and hearing their cries, justified in accepting this as a painless labor?

I fully realize the many physiological and pschycological problems involved, but it behooves us, as a scientific body, to finally settle this very important question so that this method of treatment may occupy its proper place among therapeutic measures.

In order to bring this subject to a practical conclusion, may I ask you to consider the following question: Is labor to be considered painless because the woman fails to recollect?

In reviewing the history of obstetrics, we find that various therapeutic measures have from time to time been used to allay the pain accompanying labor, but in most instances the results were such that their adoption was in a general way impracticable.

To Gauss must be credited the introduction of a method by which he obtains a state of seminarcosis with the use of scopolamine-morphine. His technic is definite, and the results obtained by him are more or less uniform. Gauss maintains that the method essentially consists in reducing the mother to a condition in which she still has nerve perception, but not mental perception. The mental state induced is not a loss of memory of previous events, but the inability to recollect what is transpiring while under the influence of the drug.

Clinically, the first sign of the action of the drug is pronounced weariness, which very soon passes into a quiet sleep occupying the whole of the intervals between the pains. During the uterine contractions, however, the patient is startled from her sleep, and apparently gives expression to pain. With the progress of the intoxication, thirst, dry throat and parched lips and flushing of the face are observed. Occasionally slight twitchings and motor restlessness takes place. After a longer action and sufficient dose, the sleep becomes deeper, so that even during pains, the patient does not become fully awake, and the only manifestations of pain is the contortion of the facial muscles and slight groaning, but consciousness is, even at this stage, fully retained. This state must be evenly maintained by skillfully graudated dosage so that a cloudy, befuddled mental condition, the principal characteristic of which is a complete amnesia extending over the whole process of birth, is obtained.

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*Read before the American Association of Obstetricians and Gynecologists, Pittsburgh, Pa., September 15, 1915.

In order to make a more comprehensive study of this method of treatment, I have endeavored to obtain all the available material by addressing a questionaire to obstetricians throughout the country. I have been fortunate in receiving replies which in the aggregate give an experience of 2,000 cases, which form the basis for this paper.

In gathering the statistics on this subject, it was my purpose to bring forth a discussion of the advantages and disadvantages of this form of treatment, and in this way crystallize American medical opinion concerning it, so that the question of "twilight sleep" may in a measure be definitely settled.

A study of the data gathered brings forth the following conditions: 1. An analysis of the various reports shows that the method is practiced according to technic, as outlined by Gauss, in fully 90 per cent. of cases. The results in these cases were uniformly favorable to both mother and child. Complications and untoward effects took place in those cases in which the dosage, as outlined by Gauss, was not strictly adhered to.

2. The standard preparation of scopolamine (stable) was at first used but little. Open market preparations of hyoscine were used, and this in all probability accounts for the great number of patients who suffered from marked restlessness. With the introduction of the stable preparation of scopolamine (Straub) this factor has been greatly diminished.

3. Morphine, or narcophin, was not repeated except in extreme cases of restlessness.

4. Nearly all agree that treatment should not be instituted until there are definite signs of active labor.

5. It is interesting to note that fully 90 per cent. of patients were treated in a special room assigned for this purpose.

6. Seventy-five per cent. to eighty per cent. of all cases treated were primiparae. The average duration of treatment in primiparae was 7 hours; in multiparae 4 fours. The average number of injections in primiparae was 5½, in multiparae 3.

7. In about 60 per cent. of cases the first stage was apparently shortened. All observers are agreed that the second stage is definitely prolonged. The third stage does not seem to be influenced.

8. Ten per cent. of patients showed various degrees of restlessness requiring restraint.

9. Four patients showed signs of active delirium during the post-partum period, but all recovered in a comparatively short time.

10. Treatment was discontinued in a small per cent. of cases for the following reasons:

(a). Too early administration of the drugs.

(b). Disproportion between fetal head and pelvis.

(c). Cessation of labor pains.

(d). Marked alterations in the fetal heart sounds.

(e). Repeated injections without any apparent effect.

11. There was no material mortality that could possibly be ascribed to this treatment.

12. Labor was terminated in primiparae by the use of forceps in 26 per cent. of cases. However, fully 80 per cent. of these were low forceps which required only lifting the head over the perineum.

13. A general anesthetic was used during the stage of expulsion. In most instances chloroform was the anesthetic of choice. Ethyl chloride, ether and somnoform were also used.

14. Seventy-eight per cent. of babies cried spontaneously.

Sixteen per cent. were born oligopneic and required active resuscitation.

Three per cent. were born asphyxiated.

Three per cent. were still-born; 12 of these or 12 per cent. may be accounted for by well recognized pathological findings, such as transposition of viscera (2 cases), monstrosities (2 cases), macerated fetus, cerebral hemorrhage (autopsy), etc.

Of the remaining 18 cases or 1.8 per cent. we are aware of a number of instances in which large doses of either acopolamine or morphine, or both were given.

15. The treatment is contra-indicated in a, primary inertia; b. labor associated with hemorrhage; c. feeble fetal heart sounds; d. multiparae giving history of short labors.

It has its greatest usefulness in primiparae, particularly during the first stage of labor where the dilatation is progressing slowly.

16. It is the consensus of opinion that amnesia with varying degrees of analgesia should be our aim. However, the majority consider that the successful termination of a case depends primarily upon the degree of amnesia induced.

17. Most investigators are of the opinion that "twilight sleep" in properly selected cases will be-

come a permanent addition to our obstetric armamentarium.

We must realize that the great enthusiasm that was created by the introduction of this treatment in a measure accounts for the high percentage of successes.

In addition to this, we must not overlook the fact that this treatment was carried out by men best fitted for this work under favorable hospital surroundings, and it is but natural to expect results that under ordinary circumstances could not have been obtained.

What the results would be if this treatment were administered in the average home by men not specially trained in the practice of obstetrics may be judged by the isolated reports coming from such sources.

It is therefore my belief that it is impossible for this form of treatment to be universally adopted, for the greatest number of women are still confined at their homes, either by midwives, or by their family physicians who have neither the time nor the training required to carry out such a delicate therapeutic measure. However, this should not detract from its value, for an analysis of the various reports shows that most investigators are fully agreed that the method of treatment is devoid of any danger to the mother, and by constant and careful watching, the dangers to the baby are also eliminated.

Judging from my personal experience extending over a period of 15 months, and covering a series of over 300 cases, I feel that the value of the treatment and its acceptance, as a recognized therapeutic measure, will depend upon our interpretation of the physiological processes that are produced by these drugs. If we accept the theory that the semi-consciousness induced prevents the actual experience of pain, although apparently present in all its clinical phases, then labor must be considered painless; and therefore to refuse to adopt "twilight sleep" would be a failure on our part to carry out the trust reposed in us. On the other hand, if the mental state induced does not prevent the sensations of pains and the patient is indeed suffering, even though it be modified, then the value of this method will depend upon the degree of pain, its diminution or analgesia and not upon the lack of recollection of pain or amnesia.

Personally, I find it difficult to reconcile the fact that a patient, displaying all clinical evidences of pain, such as crying and groaning, as is observed in these patients, does not actually experience it. However, I am fully convinced that in a goodly proportion of cases the pain is influenced to a degree that would warrant the adoption of this method in selected cases, more particularly in primiparae of the highly emotional type, and in multiparae in whom we anticipate long and tedious labors.

UNCERTAINTIES OF UNDERSTANDING ANENT CHOLELITHIASIS.*

A Semi-Critical Commentary.

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The assertion that much confusion and misunderstanding exist concerning the histo-pathology, symptomatology and rational therapeusis of lesions involving the biliary tract, may be easily verified by perusal of modern text-books and current medical literature. The nomenclature contains ambiguities and inconsistencies innumerable, inherited from the "Fathers in Medicine" and unwittingly or otherwise accepted by modern authors and incorporated in their writings.

It seems a strange and incongruous commentary that, despite the recent advancing strides toward the acme of perfection in every department of scientific endeavor, certain otherwise apparently intelligent practitioners still contend that cholelithiasis may be properly classified as a medical disorder, for the relief of which are recommended the internal administration of chologogues, cholesterin solvents, etc.—originally advocated by the ancients under erroneous etiologic and pathologic impressions—supplemented by emetics, cathartics, alkalies, enemata, gastric lavage, fomentations, hydrotherapy, electrotherapy, and other equally absurd medicinal and mechanical measures. In practically all instances the anticipated relief failing to accrue from such misdirected methods, the patient invokes the aid of osteopathy, vitapathy (whatever that may mean), "Christian Science" (which is neither Christian nor scientific), chiropractic, solidism, and other so-called advanced methods of treatment, usually with equally disappointing results.

While it is known that by the addition of certain chemical substances experimental disintegration of choleliths may be accomplished in the test tube, the pertinent fact cannot be disregarded that no drug nor combination of chemical agents has yet been discovered by the internal administration of which definitely formed concretions may be disintegrated or dissolved within the human organism without entailing the inevitable risk of perhaps irreparable structural or visceral damage. Therefore, insofar as the disintegration and expulsion of choleliths is concerned, medical treatment represents a delusion and a snare, and the idea should be discarded by those making any pretense to the possession of modern pathologic and therapeutic enlightenment. It is admitted, however, that were it possible to determine with any degree of accuracy that definite cholelithic formation had not already occurred within the hepatocystic tract before, during or following an attack of cholecystitis, cholangitis, etc., the internal exhibition of suitable drugs as a prophylactic measure might be serviceable; but the fact remains there are no pathognomonic clinical signs by which the beginning of cholelithic formation may be certainly recognized. Moreover, it is stated without the least fear of successful controversion that the diagnosis of definitely formed choleliths is oftentimes impracticable by any method of examination thus far devised, despite the clinical experience and the anamnestic discernment of the observer. Confirmation of this may be had by recalling the infinite number of patients subjected to celiotomy under the pre-operative diagnosis of "gall stones," where the observed clinical symptomatology owed its origin to pathological ovaries, appendices, ducti Fallopii, etc., the biliary tract being uninvolved as demonstrated by inspection and palpation through the abdominal incision.

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*As utilized herein the term cholelithiasis is accorded a limited interpretation, representing the terminal pathology of cholecystitis, cholangitis, cholecystalgia, cholecystectasia, cholecystoncus, or choleliths. The existence of the so-called cholelithic diathesis (i. e., the hereditary tendency toward the formation of choleliths) is emphatically denied.

It is of the utmost importance to determine the presence of biliary calculi. To accomplish this is sometimes a very difficult matter; in fact, it is often a task impossible of accomplishment. The varying symptoms of cholelithiasis are so many that it is not possible to name one of them, or to present a group of them, for the purpose of making a diagnosis, without being able to give an exception to each and every one. The only absolutely definite sign is to see or feel the calculus.[*] It must also be remembered that the clinical manifestations induced by pathology implicating any of the viscera normally occupying the right hypochondrium may be practically identical—an important observation which is not infrequently ignored or overlooked by the clinician in attempting differential diagnosis, by the therapeutist in the exhibition of internal remedies, and by the operator in instituting surgical intervention.

In a recent address one of the most prominent surgeons in America repeatedly utilized the euphonious but obviously absurd expression "gall stone disease," and others who implicitly follow his teachings have been guilty of perpetuating the apparent contretemps. The education of the writer and his histo-pathologic understanding are entirely too limited for him to adequately appreciate the existence of definite disease within cholelithic formations regardless of their location, and the correctness of "gall stone disease" is therefore seriously questioned. In any event, etiology, pathology and clinical symptomatology cannot be considered identical, by the widest interpretation of descriptive terms. It was long ago conclusively demonstrated that the primary factor in cholelithiasis does not consist in the formation of concretions, that there must exist some abnormality of the biliary secretion or the hepatocystic mucosa to encourage deposition of solid constituents normally held in solution.

The primary and essential determining factor in cholelithiasis is undoubtedly a foreign body and the irritation thereby produced; whether it be an erythrocyte, lymphocyte, leucocyte, cholesterin or calcium crystal, microbe, epithelial shred or other substance is a matter of little consequence so far as this dissertation is concerned. The frequently reiterated statement that virulent bacterial cultures may be experimentally introduced directly into the hepatocystic circulation without exciting cholecystitis or cholangitis, is not entitled to unqualified acceptance; indeed, if I am not entirely misinformed, the converse is literally true. And this is a feature which should be constantly borne in mind, since any individual who has previously suffered from typhoid fever, pneumonia, influenza, septicemia, colon bacillus infection, etc., is exceedingly prone to develop cholecystitis or cholangitis with the formation of choleliths from lodgment of bacteria within the hepatocystic tract.

The emphasis recently placed upon the importance of "bile delayed in the gall bladder" in the etiology of cholelithiasis merely represents a belated revival of the ancient erroneous hypothesis that bacterial invasion is a secondary or terminal result, i. e., that infection of the hepatocystic tract occurs secondarily instead of being the primary etiological factor. In so far as the human being is concerned, the hypothesis appears irrevocably established that bacterial invasion is the primary factor in the pathology which results in cholelithic formation; and while the character of the bacteria and the route by which they gain entrance to the economy are academic questions which cannot be discussed here, the suggestion may be permitted that bacterial invasion of any portion of the hepatocystic tract may occur through either the general circulation, the lymphatic channels, or by contiguity of structure.

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[*] Certain observers claim to have been able to successfully palpate the gall-bladder and thus determine the presence of large concretions; but, obviously, this method of examination must be futile where the calculi are small or located elsewhere within the hepatocystic tract. And while radiography constitutes an invaluable diagnostic aid in other varieties of intra-abdominal concretions, choleliths are seldom revealed by this method of investigation as at present applied. Possibly with greater improvement in technical details and x-ray apparatus the location of choleliths may be possible anywhere within the biliary tract.

"Gall stones are the result of a pathological alteration in the mucous membrane of the gall bladder, usually excited by the presence of microbes, and leading to an increased excretion of lime and cholesterin." The observation that cholecystitis and cholangitis are associated with or follow typhoid fever, appendicitis, and other intra-abdominal pathology resulting from bacterial invasion, has been too frequent to be regarded as purely coincidental.

The belief in the existence of innocent or symptomless choleliths, about which much has recently been written, evidently owes its origin to the fact that necropsy has not infrequently revealed the presence of biliary concretions in individuals who during life complained of no manifestations considered by the clinician as indicative of cholelithiasis, death resulting from accident or intercurrent affection having no relationship to the hepatocystic tract. From a clinical standpoint I desire to vigorously dispute the claim that there can exist an innocent or symptomless cholelithiasis; that symptoms referable to the right hypochondrium remain undetected is more often than otherwise due to carelessness or inattention to important details in connection with anamnestic investigation or clinical inquiry. And while accurate differential diagnosis may be occasionally impracticable, the painstaking clinician will usually be able to discover sufficient evidence of existing pathology to justify surgical intervention.

In this connection the pertinent fact must not be permitted to pass unobserved that invasion of the hepatocystic tract by pathogenic or other bacteria does not necessarily imply immediate nor subsequent cholelithic formation; biliary infection may exist for months or years before the pathology becomes terminal, i. e., the fact that cholelithic obstruction can be demonstrated affords no definite information as to the date of bacterial invasion. Contradictory as it may appear, while the primary pathology resulting from bacterial invasion of the hepatocystic tract (cholecystitis, cholangitis, cholecystalgia) may be acute, the terminal pathology (cholelithiasis) almost invariably assumes a chronic character, Cholecystectasia, cholemia and persistent icterus are important evidences of chronicity, with inflammatory or cholelithic obstruction of the ductus communis choledochus.

In the treatment of cholelithiasis the only procedure worthy of serious consideration is surgical intervention, celiotomy being indicated regardless of the fact that a positive differential diagnosis is sometimes impracticable. Even if it be demonstrated after abdominal incision that the pathology involves the appendix, the pylorus, the kidney, the ureter, the ovary or the Fallopian tube instead of the hepatocystic tract, operation was justifiable in the interest of the patient; although it must be a source of embarrassment to the surgeon who has made a positive diagnosis of "gall stones" to execute a brilliant operation and find the hepatocystic tract normal. "Gall bladder surgery demands—if surgery of any kind demands—special knowledge and experience, knowledge of the highest and experience of the broadest. And the first, the most indispensable bit of knowledge, founded necessarily upon experience, is that lesions of the biliary tract cannot, in their full extent, be either diagnosticated or prognosticated" (Richardson). Undoubtedly every conscientious surgeon will agree with the foregoing statement, yet the remark is familiar in the literature that barring oöphorectomy and appendicectomy gall-bladder surgery is the simplest and most successful within the entire domain of major surgical practice.

It is interesting to observe that during the evolution of cholecystic surgery history has several times repeated itself, e. g., as cholecystectasia was almost invariably found present, it was originally suggested that the most appropriate operative procedure was simple cholecystotomy, and after evacuating the solid or semi-fluid contents to suture the cholecystic incision. It was considered not only inadvisable but distinctly unsafe to institute exploration of the biliary ducts in search of concretions, under the evident prevailing idea that their formation occurred only within the gall-bladder, and the calculi there found having been removed nothing further could be desired. The fallacy of this view soon became apparent, when following operation the symptomatology was either aggravated or remained unchanged.

It was then concluded that prolonged drainage was an essential prerequisite to a successful outcome, and cholecystostomy (literally cholecystendysis, since the cholecystic walls were sutured to the abdominal parietes) was advocated and practiced. After an indefinite period of drainage, if the fistula did not spontaneously close an attempt was made to induce obliteration by a secondary operation. This procedure was occasionally successful, i. e., healing of the drainage tract apparently ensued, but the incision soon reopened and a permanent fistula oftentimes resulted. As the biliary ducts were unexplored, the cause of the obstruction thus remaining undisturbed, this was the most logical outcome. More important, however, was the fact that cholecystendysis and prolonged drainage failed to accomplish the purpose for which the operative procedure was undertaken.

Later peritoneal fixation of the cholecystic walls (cholecystopexys) with drainage was practiced with equally unsatisfactory results. It was then thought that obliteration of the so-called "bile reservoir," which would obviate the necessity for drainage, might produce more favorable results, and for several years cholecystectomy was the accepted procedure, but the ultimate outcome was not always entirely satisfactory from this method of treatment for the reasons already stated.

When later it became the routine practice to thoroughly explore the hepatocystic tract by visual inspection and digital palpation, the cause of previous failures became plainly apparent, i. e., that choleliths stones resident within the ducts had remained undisturbed during operations thitherto in vogue. However, cholangiotomy for the purpose of extracting imprisoned concretions was still considered hazardous, and while the information gained by more extended exploration resulted in the abandonment of cholecystectomy, the more dangerous procedure of cholelithotrity was instituted in the hope that the resulting débris might be extruded into the incised cholecyst and thus escape through the drainage tract. The logical outcome was the infliction of serious damage upon the tissues, and consequent failure in the production of enduring relief.

Certain bolder surgeons then began the practice of cholecystostomy supplemented by cholelithotomy, choledocholithotomy and cholangiotomy with drainage, and it is from this combined procedure that the most gratifying and satisfactory ultimate results have been secured. Although it was sometimes found difficult of accomplishment, experience demonstrated that the common, the cystic and the hepatic ducts could be incised and calculi resident therein removed without materially increasing the operative dangers to the patient.

Quite recently the pendulum of surgical thought has begun to swing in the backward direction, and prominent surgeons are again advocating that cholecystectomy be substituted for cholecystostomy and drainage even in simple cholecystitis without the presence of concretions. "As a matter of fact, cholecystectomy is now largely indicated in gall stone disease (?), and it may be said that practically all cases of cholecystitis and the large majority (probably 80 per cent.) of cases of gall stone disease (?) should be treated by cholecystectomy rather than cholecystostomy" (Mayo).

While the views expressed by distinguished authorities are always entitled to mature consideration, it is a trite surgical axiom that no organ nor structure embraced within the human economy should be needlessly sacrificed; and unless pathology implicating the cholecyst has advanced to the stage where restoration of functionating capacity is improbable, extirpation of the viscus is unjustifiable. Gastrectomy would appear quite as reasonable for the relief of gastralgia, gastratrophia, etc.; and the most rabid ergasiomaniac would certainly hesitate before undertaking such a formidable procedure to overcome minor clinical phenomena. Moreover, it has been repeatedly demonstrated that in the most obstinate examples of cholecystitis, with or without cholelithic formation, prompt resumption of function followed cholecystostomy, cholangiotomy and cholelithotomy with temporary drainage, and there was no recurrence of the clinical symptomatology. Therefore, the attempt to revive cholecystectomy, which was long ago discarded as an unjustifiable procedure excepting when the cholecyst is involved in demonstrable malignancy or its functionating capacity is otherwise destroyed, seems unwarranted by clinical facts; and cholecystectomy is certainly contraindicated in the pathology for the relief of which it is now being recommended, viz., "in all cases of cholecystitis, and probably 80 per cent. of cases of cholelithiasis."

The older, more difficult and practically useless operative procedures, such as cholecystenterostomy, cholecystocolostomy, cholecystoduodenostomy, cholecystogastrostomy, cholecystoileocolostomy, cholecystojejunostomy, choledochoduodenostomy, choledochoenterostomy, etc., etc., have been practically abandoned in favor of the simpler and more effective operations, viz., cholecystotomy, cholecystostomy, choledochotomy (cholelithotomy, cholangiotomy) with temporary drainage, regardless of whether the pathology be of recent or remote origin when the patient is first observed.

Conclusions:

(1) That there are many uncertainties of understanding anent the etiology, histo-pathology, symptomatology and treatment of cholelithiasis:

(2) That the hypothesis that bacterial invasion

represents the terminal rather than the primary factor in cholelithiasis has been clearly disproven:

(3) That the medicinal treatment of cholelithiasis is a delusion, there being no drug which internally administered will cause disintegration of definitely formed choleliths:

(4) That the most favorable results may be expected to accrue from cholecystostomy, cholelithotomy and temporary drainage:

(5) That cholecystectomy is illogical and unwarranted excepting where the cholecyst is already damaged beyond hope of functional restoration or involved in demonstrable malignancy.

FATAL POST-OPERATIVE PARALYTIC ILEUS. REPORT OF A CASE.*

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According to McKenna (1909) paralytic ileus is an interference with peristalsis caused by disturbed innervation of the intestine, as opposed to mechanical ileus which is primarily due to physical obstruction. The vagus nerve innervates the entire small intestine, and irritation of its fibers either causes movement throughout the small intestine or increases peristalsis; on the other hand, irritation of the splanchnic nerve tends to inhibit movement of the small intestine, and also causes anemia of its blood vessels. "The question whether paralytic ileus is caused by a disturbance in the anterior cornual cells and their corresponding sympathetic ganglia giving origin to the fibers of the splanchnic nerves, or whether the disturbance takes place in the sympathetic plexuses of Auerbach, Meisner and Billroth in the intestinal wall, will furnish an interesting and important field of investigation" (McKenna).

The author mentioned reports two cases of postoperative paralytic ileus successfully treated by secondary operation, viz., incision of an intestinal loop fixed in the abdominal wall, for drainage and subsequent saline irrigation, the fistula being later closed by resection and lateral anastomosis. He suggests, however, that this method of treatment is attended with grave danger and should be undertaken only after medicinal means have proven futile, but it is apparently indicated in extreme cases in which death seems impending, as sometimes occurs in (a) paralytic ileus following operation, (b) abdominal distension caused by suppurative peritonitis, (c) extreme paralytic ileus accompanying typhoid fever, (d) injuries to, and diseases of, the spinal column producing intestinal paralysis.

It is claimed by McKenna in a later contribution (1913) that the toxic element fully explains the cause of death in acute intestinal obstruction. He is of the opinion that when the physiologic balance of the normal intra-enteric secretion (the secretion from the duodenal mucosa, probably from Bruner's glands) is disturbed, the secretion becomes profoundly toxic, and unless this physiologic balance is quickly restored, a fatal termination surely and swiftly ensues. In other words, any influence that leads to an upper intestinal paresis sufficient to stop peristalsis blocks the normal flow of the duodenal secretion as effectively from the point of view of ileus as if the intestine were mechanically closed. The blocking of the duodenal secretion may become a fatal factor in one of two ways: (a) by direct absorption into the blood of a powerfully toxic substance, (b) because of improper mixture between the secretion of the duodenum and that of the lower intestinal tract.

McLean contends that the clinical picture in both mechanical and paralytic ileus is the same. Necropsy has shown that in some fatal cases no signs of peritonitis were present. The prevailing impression as to the cause of death in ileus seems to be that it is a toxic condition originating from absorption of bacteria or their toxins, or absorption of altered physiologic secretions of the pancreas, liver, and intestinal mucosa. McLean presents experimental data which he believes clearly refute this idea, and therefore concludes that death is not due to toxemia. Marked loss in weight was invariably noted, usually amounting to one-tenth of the body weight before death, probably attributable to loss of body fluids (vomitus, etc.), which he believes must have a tremendous effect upon blood pressure. Braun has shown in blood pressure experiments that death of animals from ileus differed in no sense from those bled to death slowly. Consequent upon the reduction in blood pressure is disturbance in the cerebral circulation, which McLean considers a prime factor in the direct cause of death from ileus. Hartwell and Hoguet have demonstrated that in experimental ileus in dogs life can be prolonged by introducing saline solution to replace the fluids lost. The rational treatment, based upon his experiments, as suggested by McLean is: (a) to subdue the distension (ileocolostomy), and (b) to restore the fluids lost by hypodermatoclysis, proctoclysis, etc.

Behan defines ileus as any more or less complete mechanical or functional obstruction occurring between the gastro-esophageal opening and the sigmoid flexure of the colon. Mechanical ileus is divided into intra-, inter-, and extra-mural changes in the intestinal walls which may cause ileus by pressure. Paralytic ileus is entirely opposite to the spasmodic type and is due to inhibition of the vagus, the nerves of Auerbach's plexus, or the nervus pelvicus, or to stimulation of the sympathetic. Paralytic ileus may result from pressure on the mesenteric glands; central lesions may also act as causative factors. Ileus may also follow the administration of an anesthetic; occurring within twenty-four or forty-eight hours after operation, it is the result of reflex causes (Allen); occurring a few days after operation, it is due to peritonitis; occurring a long time after, it is due to adhesions. Behan believes the prognosis is distinctly unfavorable. The causative factors producing death are: (a) loss of fluids—22 per cent. loss of fluids causes death (Richardson); (b) pressure on heart and lungs (Oppenheim): and (c) toxemia from absorption of toxins (Clairmont-Ranzi). In paralytic ileus the author recommends the treatment advocated by McLean, in which the aim is to relieve the distension and fill the depleted vessels. Frequent gastric lavage is recommended; the fluid loss should be supplied either by the Murphy drip or by subcutaneous or intravenous injections of saline solution; cathartics are contraindicated; morphine is seldom beneficial; eserine and adrenalin may be advantageously employed; strychnine should be administered in large doses. In paralytic ileus operative intervention is of doubtful utility.

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* Read before the West End Medical Society, of Louisville, Kentucky, October 12, 1915.

In 133 cases of ileus operated upon by Tietze exaggerated peristalsis was pronounced in all excepting those in which peritonitis had already developed or the obstruction was not organic. Wahl declares that strangulation ileus and dynamic occlusion of the intestine act alike on peristalsis, i. e., paralyzing it. The importance of distinguishing between intestinal paralysis and mechanical obstruction is regarded so vital that he does not hesitate to say that "in the former case an operation is a blunder, —excepting when a fistula into the bowel is directly planned—while with mechanical obstruction an operation can be at worst merely hastening the almost inevitably required intervention." Of 81 patients with mechanical ileus 41 died: of 35 with ileus from internal incarceration, volvulus or adhesions 9 died; of 4 with torsion of the omentum none died: of 9 with ileus from necrosis of the pancreas 5 died—a total mortality of 42.1 per cent.

Andries believes that the critical condition of a patient suffering with ileus is largely due to loss of body fluids. In post-operative ileus not quickly yielding to gastric lavage and enemata, enterostomy is a life-saving measure. In advanced cases of peritonitis in which abdominal distension is marked, enterostomy is a logical procedure which deserves universal adoption.

The following case of post-operative paralytic ileus is the only one of the kind that has come under my personal observation. The case has been extremely interesting to me, and for that reason I may be excused for reporting the history in detail.

Mrs. M. W., aged thirty-five, mother of one child, had been anemic and in poor general health for several years. I was called to see her in consultation with the family physician June 28, 1915. The only features of interest developed by careful clinical and anamnestic investigation were, a history of general ill-health extending over a prolonged period, and persistent dysmenorrhea since shortly after the birth of her child about nine years ago. Physical examination revealed a distinct tumor mass upon each side of the pelvis near the uterus, but apparently not intimately connected therewith. Based upon these findings the diagnosis of bilateral pyosalpinx was made: Operation advised and accepted.

Celiotomy with bilateral salpingo-öophorectomy performed June 29, 1915. The tubes and ovaries were fortunately removed without rupture, and the abdomen was closed without drainage. No untoward symptom was noted during the anesthesia, and the patient was returned to bed in fairly good condition. She had considerable emesis after recovering from the effects of the anesthetic, which at the time was not believed to indicate anything extraordinary. The following information is taken from the hospital daily clinical charts.

Operation June 29th. At 5 P. M. July 1st, pulse 100, temperature 98.3° F., respirations 24; emesis occurred about 1:30 P. M.

July 2nd, 8 A. M., pulse 80, temperature 98.2° F., respirations 20; patient feeling better than previous day. Same date at 11 A. M. high enema of glycerine two ounces, Epsom salts two ounces; the solution returned highly colored, with particles of feces and much flatus. At 1:30 P. M. high enema repeated; solution returned highly colored; large amount of hard feces expelled; much flatus. Shortly thereafter emesis, light greenish fluid; moderate abdominal distension noted, but the patient felt better and retained the contents of a bottle of magnesium citrate. At 9:30 P. M. high enema, followed by much flatus; small quantity of feces. Patient nauseated but resting well.

July 3rd, 8 A. M., pulse 96, temperature 97.3° F., respirations 24. Emesis, large amount of brownish fluid, earlier in the morning. Proctoclysis commenced in the afternoon. Retained albumen water and beef broth beginning the day before. During the night of July 3rd she retained three pints of saline solution.

July 4th, 10 A. M., natural defecation, large amount thin dark colored feces; pulse 80, temperature 98.2° F., respirations 20. Bowels moved again at noon, also at four o'clock, and several times later. Proctoclysis continued. Retained buttermilk and broth.

July 5th, 8 A. M., given coffee and toast, which were retained; pulse, temperature and respirations normal. Defecation, large amount of soft feces. Nausea again appeared at noon; vomited several times—brownish fluid and small amount of blood. At five P. M. retained toast and pineapple juice.

July 6th, passed restful night; nausea about 9 A. M., but no emesis. High enema at 10:30; solution returned highly colored; small particles of feces and some flatus. During preceding days there was some abdominal distension, but no special point of tenderness could be discovered at any time. At 12:30 P. M. large soft defecation; feeling well, ate mashed potato, egg and toast. At 2 P. M. pulse 82, temperature 98.2° F., respirations 20. Phenolax wafers given, two at six P. M. and two at eight P. M.: patient appeared nervous and was unable to sleep.

July 7th, 8 A. M., toast and coffee retained; low enema followed by copious evacuation. Emesis several times during the morning. At 5 P. M. emesis, yellow watery fluid, offensive odor, recognized as fecal. Gastric lavage at 7 P. M.; pulse 96, temperature 98.3° F., respirations 24. Considerable soft distension, over entire abdomen. Two high enemata at intervals during evening; solution returned highly colored, with particles of feces and flatus.

July 8th, 9 A. M., high enema; solution returned almost clear but accompanied by flatus. Gave cascara pills, eserine 1/30th grain hypodermatically every two hours; strychnine had been administered regularly since date of operation. Abdominal distension still soft and general. During evening of same date, high enema of milk of asafoetida one pint, water one pint; solution slightly colored; still some flatus; distension continued.

July 9th, 8 A. M., emesis earlier in morning, fecal material. Gastric lavage practiced; milk and molasses enema; solution returned unchanged. Pulse 100, temperature 98.5° F., respirations 22. Given one drop doses croton oil one hour apart, also atropine 1/150th grain and strychnine 1/30th grain, every three hours. Gastric lavage during the evening; always removing large quantity fluid having fecal odor. Emesis continued, fecal in character.

July 10th, 9 A. M., repeated milk and molasses enema; fluid returned as it entered, accompanied by flatus. Proctoclysis continued at intervals; no vomiting since early morning.

July 11th, 9 A. M., high enema; solution returned clear. Administration of spiritus frumenti commenced, half ounce every three hours. At 9 P. M. patient resting comfortably. In the early morning this date, after gastric lavage until fluid returned clear, eight ounces of Russian oil were introduced into the stomach through the tube. At 11 P. M. small, thin, involuntary defecation, later followed by flatus and large fecal movement. Abdominal distension considerably less; pulse 100, temperature 101.3° F., respirations 16.

The bowels moved involuntarily many times July 12th, and the patient again retained nourishment. Involuntary defecation July 13th, none on the 14th. Gastric lavage continued morning and evening. Russian oil repeated July 14th. Natural defecation morning of the 15th; temperature 99° to 101° F., abdomen again markedly distended.

July 16th; 9 A. M., high enema, followed by large formed defecation; much flatus. During the evening of this date fecal vomiting again occurred, abdominal distension rapidly increased, and in spite of all that could be done the patient died at 4 o'clock A. M. July 17th, 1915. Necropsy not permitted.

On account of the gradual onset, the general soft, "gassy" abdominal distension, with no points of special tenderness, the entire absence of peristalsis and borborygmus, I diagnosed this case as one of post-operative paralytic ileus. Had there been the least peristaltic movement, it could have been easily detected on account of the thinness of the patient's abdominal wall. Of course, it is well known that in mechanical obstruction violent peristalsis occurs above the site of the obstructing lesion. It will be noted that the patient's temperature remained normal for about a week after the operation.

Under all the circumstances I could see no reason for reopening the abdomen in this case. In my experience it has been found necessary to reopen the abdomen only once. That was also in a case of bilateral pyosalpinx in which the patient's bowels refused to act after the original operation. There was violent peristalsis, borborygmus, and a localized point of tenderness. Defecation did not occur for six days; the abdomen was then reopened and high along the ileum where it had not been touched during the operation a small adhesion and kinking were found. As soon as the pathology was relieved free defecation occurred, and the patient made a rapid and satisfactory recovery. This, however, was clearly a case of mechanical obstruction.

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Andries: Mich. State Med. Soc. Jl., February, 1915.

Pain in Breast Cancer.

Pain has been looked upon as a valuable symptom, particularly as applied to tumors of the breast, but it is most misleading. Up to the point of cell degeneration and breaking down of tissue or where there is pronounced pressure upon adjacent structures, cancer, in its early stage, is not painful. Rodman says that rarely if ever does cancer of the breast become painful the first year. If we wait for pain to develop often the day of salvation is past.—J. S. Rardon, in *The Ohio State Medical Journal.*

EMPLOYMENT OF THE AUTOMOBILE TO DEVELOP CURRENT FOR RADIOGRAPHY.

C. R. Fishel, M.D.,
Thurston, Ohio.

The photograph shows the generation of current for a portable *x*-ray outfit by a gasoline automobile entirely independent of any commercial current. Any style of automobile having the transmission on the rear axle and the propeller shaft exposed can be readily employed for this purpose. The one used by me and shown in the illustration is a Studebaker "Six."

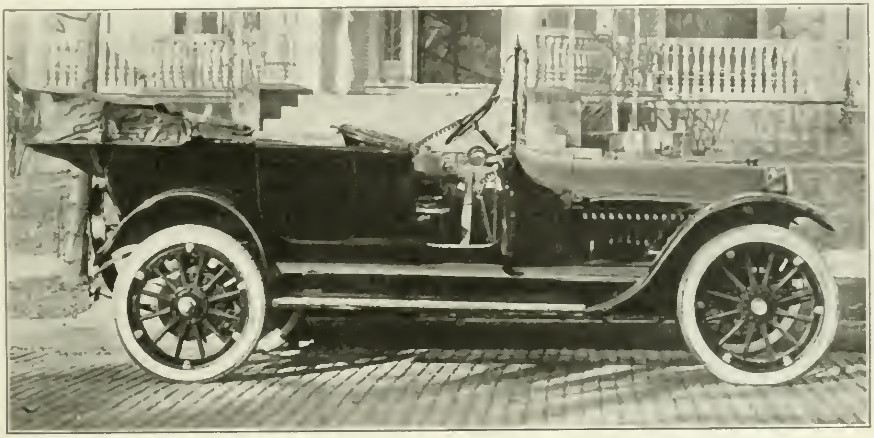

Fig. 1 shows generator on front seat of Studebaker automobile, belt running from pulley on drive shaft to generator, volt-meter in series, and wire cables running from generator into patient's house.

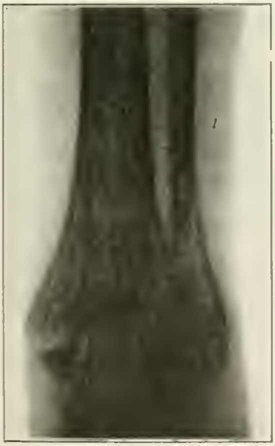

Fig. 2. A radiogram made with portable x-ray coil activated by generator run by automobile motor.

I have a split pulley mounted on the propeller shaft underneath the front floor boards. The generator is placed on the front seat, after removing the cushions, and attached with a belt to the pulley on the propeller shaft.

The generator, which is of the A. C. type, has a capacity of 10 amp. and 110 volts at 2,000 R.P.M. By using a small pulley on the generator this speed is very easily obtained and the six-cylinder motor will maintain a current without any marked variation. A volt-meter, as shown in the illustration, is attached in circuit with the generator, and the car motor is speeded to give the proper voltage.

From the generator runs a pair of wires in a flexible cable to the bedside of the patient, where they are connected to the *x*-ray apparatus in the following manner: At the terminal of the line wire is a fuse box of the proper capacity to protect the coil. After passing through the fuse have two household pull chain sockets mounted in close apposition, and so arranged that when the circuit is closed in one it will be open in the other. Fasten the pull chains of each together so that they can be switched at the same time.

In one of the sockets place the plug attachment of the coil, and in the other a 500-watt incandescent bulb, which is approximately the capacity of the coil used. Adjust the speed of the generator to proper voltage with the light bulb in circuit, then pull the chain and the current will pass through the coil. Pull the chain and again light the bulb after the proper exposure has been made.

Considerable care should be used in selecting a coil for this purpose. I have found the Campbell Model E excellently adapted for this use. It is light and compact which affords easy transporting and installing and it gives a good, clear radiograph with short exposure. It can also be used for treatment.

This outfit can be connected up in 15 minutes time after arriving at the home, and fills a long known need for the successful treatment of fractures in the rural districts where commercial current is not available.

Paronychia.

Paronychia or "run around" is often very troublesome and sometimes long continued under the usual manner of treatment. The keynote here also is relief of tension and drainage. To obtain this, one should make an incision parallel to the outer borders of the involved nail, avoiding the nail or its matrix and carrying the incision high enough on the finger to reach the bottom of the sulcus. Then push back the eponychium lifting up the base of the nail, which will be found quite loose, turn it out with sharp-pointed scissors, leaving, however, the distal portion of the nail which is still attached. Pack lightly the space thus uncovered to secure capillary drainage and then use hyperemia and antiseptics by moist hot dressings and the rubber band lightly applied at the most proximal part of the finger.—S. J. Waterworth, in *The Pennsylvania Medical Journal.*

Types of Ulcer Symptoms.

1. *The regular type of duodenal ulcer* is looked upon as that in which the pain or distress comes within two to five hours after meals, accompanied by gas, sour stomach and vomiting, one or all appearing about the same hour, and continuing until the next meal, or until food, an alkali, vomiting or irrigation brings comfort by relieving the acid state. These symptoms are repeated with certain uniformity each day for days, weeks or months, and then there is an intermission of perfect ease, or at least a marked remission ensues. These periods of attack and intermission may come and go for years, the only change, perhaps, being an increase in severity until the time comes when complications have altered the gastric movements and functions.

2. *The regular gastric type,* as we prefer to consider it, has the same periodicity and the same group of symptoms, though not so clearly cut as in the duodenal lesion, but, as we have shown, in at least one-fourth of the cases the difference is quite indistinguishable. Pain or distress comes sooner after meals, does not continue so clearly to the next meal, may cease for a time to begin again before the following meal, and is often eased by food, though not so often nor so clearly as the pain of duodenal ulcer. Fear of food-pain is more often noted. Food in small amounts gives ease, while in larger amounts it gives pain. Hunger-pain is not so clear cut, and not so frequent, because the pain may pass before mealtime arrives. Careful diet seems to give more relief than in duodenal ulcer, unless complications are present. Sour food is not so troublesome in the high as in the low ulcer, and the position of the body as well as physical activity plays a more important ease rôle in the gastric than in the duodenal cases. A definite intrinsic gastric complaint runs throughout the history, though the features seem less clear cut than in duodenal ulcer, and one feels a greater lack of certainty in the diagnosis. However, the fact remains that the final diagnostic figures in this series hold clearly as well in the gastric as in the duodenal types.

3. *The irregular peptic ulcer type* of history has lost the distinctive *time* of *onset* of *symptoms* and their control. We find such histories in cases of obstruction, perforation with adhesions, hour-glass stomach, saddle ulcer, lesions of large areas, or any condition where function and movement are limited. —Christopher Graham, in *The Boston Medical and Surgical Journal.*

Prostatic Abscess.

In urinary disturbances originating in prostatic disease, it is essential to ascertain the exact lesion. In acute prostatiti, concerning which there should never be any diagnostic confusion, beside the frequency, tenesmus, and blood which are its constant symptoms, there is at times an acute retention due to abscess formation which encroaches upon the urethral canal and finally shuts it off entirely. Put your finger into the rectum and you will feel a large, painful, hot fluctuating mass. The history of a recent gonorrhea will make the diagnosis clear. The patient will tell you that he contracted gonorrhea about four weeks previously, and that the discharge had about ceased, when suddenly he was seized with frequency, urgency, pain, and bleeding at the end of micturition. There later develops a terrible pain in the prostate and abscess formation has taken place.—Clarence Martin in the *N. Y. Medical Journal.*

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, FEBRUARY, 1916.

CONCERNING THE TEETH.

Medicine until very recently has failed to take cognizance of the teeth. Dentistry developed as a cognate but independent art. With meager preparation in the fundamentals of pathology and the principles of surgery, dentists have gone on in their own way practicing this very important branch of surgery. So long as they confined themselves to extracting decayed teeth and making artificial dentures to take their places, they were well within the range of their capabilities; but when they undertook the treatment of teeth which had lost their blood supply and innervation and had become foreign bodies, a degree of knowledge was required which the education of the average dentist did not provide. Thus for a long period root-canals, containing dead nerve and other structures, encased in a mineral wall, have been closed and hermetically sealed with caps and fillings.

In the course of time the tendency is for these canals to become infected, either directly or through the blood and lymph streams. Being closed externally by caps and fillings, drainage is impossible. The infection proceeds inward, passes through the apical foramena, and attacks the socket lining, and then the bone at the apex of the socket. The backwoodsman and the poor, not having access to dentists, permitted their teeth to rot off, and thus were always provided with drainage of their root-canals; they have been spared the physical ills and disasters which visited those who thought they were more enlightened and who went about with "a mouth full of gold." It is difficult to think of a more dangerous and unsurgical procedure than the sealing in of root-canals, containing dead animal tissue; but this is what dentistry has been doing for the past twenty years. Perhaps we should not say dentistry, but dentists; because there have been a few enlightened men in this profession who have understood the pathological principles involved and have conscienciously cleaned out and filled root-canals down to the very apex before sealing the canal with cap or filling. Still the great majority of people, who have undergone dental operations upon dead teeth, have had this surgical crime perpetrated upon them.

Now, at the other end of the dilemma, the physician and surgeon have been treating constitutional diseases of unknown infective origin. A great step in advance was made when it was discovered that the tonsils were a source of constitutional infection, and played an important rôle in the etiology of rheumatism. But the information which has been acquired concerning the tonsils has been quite inadequate, and there has remained a wide hiatus still to be filled. Rheumatism, arthritis deformans, valvular diseases of the heart, arteriosclerosis, neuralgia, and the countless lesions secondary to these, have had an unknown etiology until the newer light has been thrown upon the sources of infection. Recent researches have identified the intimate connection between the infections of the roots of the teeth and these constitutional diseases. Teeth that give no pain or other local symptoms, and which have been "successfully" crowned, upon Roentgen-ray examination are found to have infective processes at their roots which result in the rarification of bone and the development of cavities containing growing bacteria. The streptococcus viridens has been commonly found in the bone cavities at the ends of the roots of such teeth. It is often present in pure culture. This organism has been found in the exudate on heart valves and in rheumatic joints.

What is of much importance to the surgeon, the same organisms that are found in these cases of infected teeth are found also in ulcers of the stomach and duodenum. Curiously enough, streptococcus viridens, taken from a gastric ulcer, and injected into the blood of an animal will in a large proportion of cases produce gastric ulcer in the animal. In such ulcers of blood origin, the same streptococcus can be recovered. It is a well-known principle in surgery that lesions of infective origin heal when the infective focus is removed, however remote it may be. It is possible that our surgery of gastric and duodenal ulcers should begin with the teeth.

The up-to-date dentists are now teaching the surgeon some of the things that must have a profound influence on surgical practice. It is obvious that, among other things, not only must the dentist make Roentgen-ray pictures of the teeth and alveolar processes, but the surgeon also must have this information in all cases of doubtful infective origin.

These root infections are something quite independent of alveolar disease due to the ameba. From the surgical standpoint they require drainage. Removal of the tooth supplies this requirement; but the modern dentist has taken a step in advance of general surgery. He attempts sterilization without drainage. The streptococcus viridens is not a pus-producing organism. Modern dentistry proceeds to clean out the root-canal, removing all animal matter down to and through the apical foramen. There remains the infection in the periapical tissues and the bone. Salt solution is passed into the canal and beyond; a wire of pure zinc is then introduced through the canal; through this a strong electric current is passed for the purpose of producing electrolysis. Theoretically the sodium chlorid is split up and pure zinc is liberated from the wire. The nascent chlorin and chlorid of zinc which are formed possibly contribute to the sterilization of the infected focus. Whatever happens, one thing is observed, and that is that the granulation tissue which fills the cavity becomes replaced by bone after a few treatments and filling of the canal.

Modern dentistry is thus taking a step in advance of general surgery. It has taught us that the teeth are the sources of infection in many diseases in which we have been satisfied to treat the symptoms because we did not know that there was anything else to treat. It is now teaching us that infection associated with a foreign body, such as a dead tooth, may be treated and cured without removal of the foreign body.

The time has now arrived when no hospital, or clinic, doing general surgical work, can be regarded as being upon a scientific basis unless it has a dental department, with facilities for the finest Roentgen-ray examination of the alveolar processes and facilities for treating the infections which are associated with the teeth.—J. P. W.

THE BROADENING OF ORTHOPEDIC SURGERY—THE AMERICAN JOURNAL OF ORTHOPEDIC SURGERY.

With its current issue that important publication, *The American Journal of Orthopedic Surgery*, undergoes a significant change. Formerly a quarterly published by the American Orthopedic Association to replace its annual *Transactions*, and largely limited in contributions and circulation to the membership of that body, the *Journal* is now a monthly, published for but not by the association and expanded in its purpose to represent "the vast amount of work that is now being done in bone and joint surgery in its widest meaning."

The significance in this journalistic happening is of the broadened sphere of orthopedic surgery. Indeed, the modern orthopedist is not or, at any rate, will not much longer continue to be, merely an orthopedist, i. e., a corrector of deformities. He is not content to confine himself to the application of arches, braces and plaster casts, the cutting and transplanting of tendons. He is reaching out to invade another territory in the dominion of the general surgeon, viz., the entire field of bone and joint affections—traumatic infectious and neoplastic, as well as congenital.

That a considerable number of general surgeons have devoted much time to the study of bone and joint pathology, that some of them have largely specialized in this field, is indicative, we think, of a transition stage in the development of a new specialty; and the general surgeons must look to their laurels if they do not wish to see this highly interesting work taken away from them.

The expansion of orthopedic surgery into the surgery of the bones, joints and muscles, not yet an accomplished fact, to be sure, is parallel with the development of gynecology to include, in practice, abdominal surgery—ground which the general surgeon grudgingly shares but has not surrendered. It is comparable, too, to the development of andrology—divorced from syphilography and dermatology, its former ill-mated consorts—into genito-urinary surgery, a special field in which, again, however, the general surgeon acknowledges the invader without evacuating the territory.—W. M. B.

"LOCAL TONSILLECTOMY"—AND SOME OTHER THINGS.

In medical writing, reasonable condensations and abbreviations are usually not objectionable and often quite desirable; thus, such expressions as, "the Wassermann was negative," "diazo positive," although not elegant and certainly not accurate, hardly deserve criticism, for they have grown into general usage, and the omission of the word "reaction" neither confuses the meaning nor does great violence to good taste in scientific language. However, we have complained before, and must again, of the appearance in cold print of such slang as *an acute abdomen, a chronic appendix, the patient had no temperature*. But if one understands in this operating-room slang that *an acute abdomen* means *an acutely diseased abdomen*, that a *chronic appendix* means *a chronically diseased appendix* or *chronic appendicitis*, that *the patient had no temperature* means that *the patient had no fever*, what, oh what, is one to understand by the expression *local tonsillectomy?* Are not all tonsillectomies local? And yet in a recent publication we twice encountered *local tonsillectomy*, when the author meant *local anesthesia tonsillectomy!*

Literary style and fine writing, however desirable, are not essential to purely scientific articles; they are qualities which only a few possess. But a certain amount of accuracy in expression and a decent respect for our written language ought to govern all those who would put their thoughts in print.

While we are in scolding mood we would complain of the tantalizing mistake that the great majority of contributors make, namely, writing or pasting legends for illustrations on the pictures themselves. It seems curious that this should be done by so many authors who ought to know better, for a moment's reflection would tell them that the photographs or drawings must go to the cut maker, while the captions must go to the printer. When, as is usually the case, the legends are written or pasted (and usually pasted abominably tight) on the pictures the editor must have all these titles copied for the printer. The proper thing for the author to do, of course, is to write out all the legends, properly numbered, at the end of the manuscript; the illustrations are simply to be marked on the back with his name and the serial number, "fig. 1," "fig. 2," etc.

We would also complain, even more feelingly, of the author who submits his manuscript closely typewritten, evidently assuming that it is a perfect composition in which there can be no need of editorial correction. Articles thus written are the ones that need correction most!

We may some day yield to the strong temptation to write an artitcle on how to write an article. Perhaps we had best withhold the rest of the commandments until we may inflict this preachment upon a profession that will probably be too busy to bother with it.—W. M. B.

After anal operations it is advisable to remove the tampon tube in 48 hours or earlier. Left longer, the tube may cause a troublesome edema.

Letter to the Editor

THE ALLEN TREATMENT IN DIABETIC GANGRENE.

Columbus, O., January 13, 1916.

Editor, American Journal of Surgery:

The January issue of your Journal came in today, and I have read with interest your editorial on the Allen treatment of diabetes in its relation to surgery. In connection with this editorial the following brief resumé of a case may be of interest:

J. A. S., aged 65, was seen by me in consultation December 16, 1915, with the expectation of an immediate amputation for gangrene, but finding sugar in his urine I declined to operate until he was in better shape, as I feared a catastrophe. He was at once put on the Allen treatment, and I sent my copy of the October issue of the *American Journal of the Medical Sciences* to the attending physician, who carried out the treatment. Several specimens of urine were sent to me and examined by my regular pathologist. The sugar promptly disappeared from the urine, as did also the diacetic acid and acetone. My pathologist was so interested in the case that he drove in his machine thirty miles to get a specimen of blood, which showed the presence of sugar. After three weeks of treatment there was marked general improvement, but no special improvement in local conditions. I then amputated; a rapid amputation in the lower end of the thigh. The operation went off without any hitch, there was no hemorrhage, and he took the anesthetic (ether) beautifully. I am sorry to say, however, that diabetic coma, which we had been fearing, developed quite promptly. I operated on the afternoon of January 5th, and he died in coma a little before midnight of the 7th.

I have operated upon a considerable number of diabetics in years gone by, before we knew anything of the Allen treatment, and I recall but one other case in which coma followed so rapidly; all others, I think, made at least temporary recoveries.

Very sincerely yours,
J. F. Baldwin.

Surgical Suggestions

Indolent, sloughy ulcerations in dusky red raised skin infiltrations are often gummatous.

Rectal and sigmoidal cancers are too often treated for "dysentery." An examination of the lower bowel, important in *all* doubtful cases, should never be omitted in patients with mucous or bloody discharges.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

Is Venereal Prophylaxis in the Navy a Failure?

Surgeon Richman Holcomb of the United States Navy, writing in the January issue of *The Military Surgeon*, disputes the success of present methods of venereal prophylaxis in the navy. While it is true that the problem of prevention of venereal diseases represents a distinct type of activity in the navy, the question asked is of sufficient general importance to note his answer.

From the standpoint of military and naval authorities, venereal diseases may be attacked along three lines—moral prophylaxis, punitive prophylaxis, and medical prophylaxis. The first two measures have had a variable course and as a whole have not been developed to their fullest possibilities. Moral prophylaxis is an immense social movement and can attain success only when moral ideals are thoroughly assimilated and practically become part of personal religion. It is but natural that propaganda of this character to be practical cannot be delayed to the post-pubertal period or maturity of men such as those enlisting into the military or naval branches of the service.

The greatest field for moral prophylaxis is inseparably connected with the training to be received during the early years of life in the home, supplemented by teachings in church or school during the period of adolescence. Furthermore, the general attitude of the medical profession toward the moral problems related to venereal diseases requires greater crystallization and more forcefulness. It is obvious that the peculiar mode of living of our naval forces opposes marked progress of moral prophylaxis.

Punitive prophylaxis seeks to reach men's morals through their pocketbooks. It aims to deprive an unlisted man of his pay during a period of time when he is invalided because of his misconduct, to use the words of the law, rather than from injuries received in line of duty. The adoption of this measure in the navy has failed to have the restraining influence that was originally attributed to it and the term "misconduct" is not sufficiently definite to permit punitive measures to be adequate and justly applied.

In 1909 a propaganda was developed to secure the co-operation of commanding officers and medical officers in combating venereal diseases. It was ordered that proper space be provided for the administration of prophylactic measures to men who had exposed themselves during leave of absence to venereal diseases. These orders have been followed out for six years and all cases of venereal diseases were admitted to the sick list for one day for purposes of record, regardless of whether the disease incapacitated the man for service or not. Naturally, this statistical procedure caused a large increase in the number of admissions of enlisted men for venereal diseases. Considering admissions alone, the rate practically doubled during the six years following the introduction of the law as compared with the six years preceding, in the case of gonorrhea. A similar increase was noted for chancroid. For syphilis the increase was slight, but nevertheless apparent.

From the standpoint of navy efficiency, the degree of incapacity is of greater importance than the mere rate of admission. "Considering the damage rate to be the total number of men per thousand whose services were lost to the government for the full period of one year, the average rate for gonorrhea for the six years before the introduction of prophylaxis was 1.06 per thousand, while for the subsequent six years the average rate was 1.47 per thousand." For chancroid the corresponding figures were .440 per thousand and .451 per thousand. From these two figures, it is patent that the prophylactic services were markedly unsuccessful. The damage rate for syphilis previous to the institution of prophylaxis was 3.59, while for the six years succeeding its introduction the rate was 3.21 per thousand. This improvement in the damage rate does not attest the success of prophylaxis but is rather indicative of an improvement in the treatment of syphilis.

It is obvious from the figures above mentioned by Surgeon Holcomb that venereal prophylaxis has not fulfilled its early promise. A potent reason for the failure of medical prophylaxis lies in the fact that the preventive measures were not immediately applied but were utilized after varying periods of delay, frequently after many days, owing to the indifference or lack of interest of some of the enlisted men to preventive measures organized to protect them from the results of their own activities.

It has been fairly well established that prophylactic treatments in order to be successful must be applied very promptly after the coitus. The longer the period of time elapsing between the exposure to infection and the application of protective medicaments, the less likelihood there is of success.

The stress that is being placed upon venereal prophylaxis apparently has not been warranted by the naval experience. Such hygienic measures possess value only when there is prompt utilization of them. More important, however, from the standpoint of prophylaxis is the general lack of high moral ideals in matters pertaining to sex. These two factors appertain to the civil community with as great force as to those in the army or navy. These observations of a thoughtful naval surgeon merit the consideration of the profession and his plea for a stronger sympathy with the moral aspects of this problem deserves attention.

The solution of the problem of venereal diseases is not to be sought in campaigns for the use of venereal prophylaxis nor in the establishment of segregated districts. The foundation of the entire venereal problem is deeply entrenched in the very moral being of mankind. Until moral development assumes a higher and more spiritual plane, the sex problems will continue to undermine the physical, mental and moral forces of the community and the grist of physical and mental invalids will continue to fill our hospitals, dispensaries, asylums, and penal institutions.

Book Reviews

Text-Book of Nervous Diseases. For the use of students and practitioners of medicine. By Charles L. Dana, A.M., M.D., L.L.D., Professor of Nervous Diseases in Cornell University Medical College; Neurologist to the Montefiore Hospital; Neurologist to the Women's Hospital, etc., etc. *Eighth Edition.* Octavo; 632 pages; 202 illustrations, including four plates in black and color. New York: Wm. Wood & Co., 1915.

A book that has reached eight editions in 23 years is almost *hors concours* as far as a critical review is concerned. We need only say that this book is even more valuable than its predecessors, owing to numerous emendations, additions and revisions. Of the more important changes we mention the following: The chapter on the Anatomy of the Nervous System has been left out. This is wise in a book that aims to be as practical as this one. The chapters on Syphilis and Serology of the Nervous System have been completely rewritten. This applies also to the chapters on poliomylitis, cerebro-spinal meningitis, and tumors of the spinal cord and brain. In addition, many new illustrations have been added.

The work maintains its air of authority and scholarship, and is unquestionably one of the best books upon the subject with which we are acquainted.

The Nose, Throat and Ear. Their Functions and Diseases. A Treatise upon the Breath-road, Food-road and Accessory Organs. By Ben Clark Gile, M.D., Instructor in Otology in the University of Pennsylvania and formerly Assistant in the Throat and Nose Dispensary of the University Hospital; Assistant in the Department for the Nose, Throat and Ear, and Dispensary Chief at the Presbyterian Hospital; Consulting Laryngologist to the Taylor Hospital and formerly Instructor in Otology in the Polyclinic Hospital and Post-graduate School of Medicine, Philadelphia. Small octavo; 456 pages; 131 illustrations, 8 in colors. Philadelphia: P. Blakiston's Son & Co., 1915. $2.75, net.

Gile has taken for the basis of his book a few anatomical facts which he has correlated to their physiological use, and upon this he has developed the exposition of pathological conditions. The volume is mainly for teaching purposes and therefore does not aim to go into too thorough scientific detail. It is well interpolated with interesting cases to explain the main points.

Too little attention is ordinarily given to the desires of the post-graduate student. It is therefore a pleasure to recommend this book to them, to help them to understand the mass of detail they attempt to digest in a short time.

Diseases of the Skin By Henry H. Hazen, A.B., M.D., Professor of Dermatology, Georgetown University and Howard University. Octavo; 539 pages; 233 illustrations, including 4 color plates (Lumière photographs). St. Louis: C. V. Mosby Co., 1915.

This new text-book occupies a middle ground between the compend and the treatise. It is a working manual, convenient for quick reference, written for the general practitioner. It deals, therefore, chiefly with the commoner skin affections, deliberately omitting the rare ones. The descriptions are clear and, as an unusual feature of a work of this size on dermatology, it discusses the histopathology of many of the skin diseases. The photographs, most of them original, are excellent.

Progressive Medicine. Edited by H. A. Hare, Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College, Philadelphia; assisted by L. F. Appleman, Instructor in Therapeutics, Jefferson Medical College, Philadelphia. December 1, 1915 Philadelphia and New York. Lea & Febiger.

This number contains the following reviews. Diseases of the digestive tract and allied organs, the liver, pancreas and peritoneum, by E H. Goodman; diseases of the kidneys, by J. Harold Austin; genito-urinary diseases, by Charles W. Bonney; surgery of the extremities, shock, anesthesia, infections, fractures and dislocations and tumors, by J. C. Bloodgood; and practical therapeutic referndum, by H. R. G. Landis. These reviews are of an unusual order of excellence.

Theory and Practice of Bloodletting. By Heinrich Stern, M.D., LL.D., Visiting Physician St. Mark's Hospital, etc., New York. Octavo; 264 pages. New York, 1915: Rebman Company, 1915.

Since blood letting has again come into favor as a therapeutic measure, the author has deemed it appropriate to collect our entire knowledge concerning this procedure into a small volume. The subject is taken up very thoroughly and in great detail. We doubt whether phlebotomy is really of sufficient importance to warrant its being made the subject of an entire book for, as is stated by Stern, in spite of its occasional usefulness it is by no means the panacea which some would have us believe.

The first portion of the book dealing with the history of blood letting will be found of particular interest Following this are long chapters on its use in diseases of the respiratory tract, circulatory disturbances, uremia, etc. A bibliography of about ten pages is appended.

Diseases of the Nose, Throat and Ear. By William H Kelson, M.D., B.S., F.R.C.S. (Eng.), Surgeon London Throat Hospital, Golden Square; Hon. Surgeon (In Charge of Throat, Nose and Ear Department), City Dispensary; Lecturer On Diseases of the Ear, Polyclinic. Small octavo; 270 pages; illustrated London, 1915: Henry Frowde; Hodder and Stoughton. Price, $3.00.

This will be found a very useful text book for the general practitioner or the senior student. It is a fairly complete consideration of the diseases of the nose, throat and ear, the aim of the author being to lay especial stress on those subjects with which the general practitioner would be likely to deal, and only briefly considering those of sufficient complexity to call for the skill of a specialist Minor operations and treatment, however, receive very detailed attention. The book is profusely illustrated with excellent diagrams and pictures.

Cerebro-Spinal Fever. By Thomas J. Horder, M.D., Asst. Physician, St. Bartholomew's Hospital, Major (Temp.) R.A.M.C., Serving with the British Expeditionary Force. Duodecimo; 179 pages; 17 illustrations. London: Henry Frowde, Hodder and Stoughton, 1915.

During the winter of 1914-15 and the spring of 1915 a larger number of cases of epidemic cerebro-spinal meningitis were seen in England than at any time since the disease has been recognized. To meet the desires of the practitioners, to many of whom the disease was a novelty, this little book has been written. It will be found excellent both in subject matter and arrangement. It is compact in form, but thorough in the treatment of its subject, and can be highly recommended as a treatise on epidemic meningitis.

Manual of Embryology. By A Melville Paterson, M.D., F.R.C.S., Professor of Anatomy in the University of Liverpool, etc. Duodecimo; 391 pages; 304 illustrations. London: Henry Frowde and Hadder and Stoughton, 1915.

An understanding of embryology—human and comparative—is an essential part of the education of the thoughtful physician. A familiarity with the pre-natal processes of development explains many of the abnormalities and clears many of the problems that medicine encounters. To obtain that familiarity succinctly this small manual will be found very satisfactory. It is an expansion of the author's lectures to medical students.

Books Received

Medical Lectures and Clinical Aphorisms. By Samuel Gee, M.D., Fellow of the Royal College of Physicians, Honorary Physician to H.R.H., the Prince of Wales, Consulting Physician to St. Bartholomew's Hospital. With Recollections by J. Wickham Legg. Duodecimo; 416 pages. London: Oxford University Press, 1915. Price, $2.00 net.

A Guide to Gynecology in General Practice. By Comyns Berkeley, M.A., M.D., M.C. (Cantab), F.R.C.P., London, Obstetric and Gynecological Surgeon to the Middlesex Hospital, and Surgeon-in-Charge of the Military Hospital at Clacton-on-Sea, Surgeon to the Chelsea Hospital for Women, etc.; and Victor Bonney, M.S., M.D., B.Sc., London, F.R.C.S., Assistant Obstetric and Gynecological Surgeon to the Middlesex Hospital, Surgeon to the Chelsea Hospital for Women, etc. Octavo; 452 pages; 144 illustrations. London: Oxford University Press, 1915 Price, $6.50.

Instinct and Intelligence. By N. C. Macnamara, F.R.C.S.P. Duodecimo; 222 pages; illustrated. London: Oxford University Press, 1915. Price, $2.00.

Bandaging. By A. D. Whiting, M.D., Instructor in Surgery in the University of Pennsylvania. Duodecimo; 151 pages; 117 illustrations. Philadelphia and London: W. B. Saunders & Company, 1915. Cloth, $1.25, net.

Diseases of the Throat, Nose and Ear. By William H. Kelson, M.D., B.S., F.R.C.S., England, Surgeon, London Throat Hospital, etc., Duodecimo; 270 pages; 89 illustrations. London: Oxford University Press, 1915. Price, $3.00.

Progress in Surgery

A Résumé of Recent Literature.

Schrapnell Bullet in the Right Chamber of the Heart, Operative Removal, Cure. (*Schrapnell Kugel in der rechter Herzkammer, Operative Entfernung. Heilung.* Richard Freund and Carl Caspersohn. *Muenchener Medizinische Wochenschrift*, August 31, 1915.

The patient was a 20-year-old musketeer, who received a shrapnell bullet wound while on service in the eastern front. The bullet struck him in the region of the left lobe of the liver while he was bending forward. He immediately fell over and had to be carried on a stretcher to the emergency hospital. From there, after a stay of 14 days, he was taken to Hamburg and placed under the charge of the authors. He seemed to suffer no special distress that might be referred to heart interference. His pulse was 72 and regular; there was no dyspnea and no cyanosis. The *x*-ray examination conducted by Albers-Schönberg, Asbeck and Zehbe showed the bullet to lodge 7 cm. removed from the anterior chest wall (transverse exposure with patient on back). Fluoroscopy proved the bullet to lodge in the region of the right ventricle; it followed the motions of the heart in all positions and attitudes the patient assumed and showed no motion of its own. Deep inspiration caused it to move upward somewhat and on expiration it moved downward and seemed to lodge in the deepest part of the right ventricle near the septum. As the right ventricular wall measures on the average 3-6 mm. in thickness, and the schrapnell bullet 13 mm., they were led to the assumption that the bullet must have lodged within the right ventricle proper. This they found actually to be the case on operation. The Kocher thoracotomy flap modified by Podrez was made, permitting the hand to enter the wound. An incision 8 cm. into the pricardium was made for the same purpose (the left pleura was separated gently and retracted by a gauze compress). The heart was held by the left hand and brought forward; the bullet was located in the right ventricle. A small incision immediately over the same was made, and at the depth of 4 mm. the knife came upon metal—the bullet. It was dislocated by the blunt end of the knife and extracted, whereupon a thick stream of blood escaped. The left hand immediately controlled the bleeding and four silk sutures were rapidly passed through the opening just to the endocardium and the knot tied by an assistant. The pericardium was sewn over also by silk stitches (10 in number), leaving a small opening at the lower angle for drainage, and the chest flap restored in the typical manner. There was no hemorrhage. The rubber drain was removed at the end of three days because it had caused an irregular heart action. The bandage was removed on the fourth day. Following this the pulse became irregular again, breathing more difficult and pressure over the chest. This it was found was due to an accumulation of serum within the pericardium, which was relieved by reintroducing the drain. Further convalescence was disturbed only by a suppurative left-sided parotitis which required incision drainage, and after four weeks the patient was able to leave his bed. After two months he was completely well.

Concerning Anaerobic Sepsis. (*Ueber Anaerobensepsis.*) B. R. Pribram, *Muénchener Medizinische Wochenschrift*, October 12, 1915.

Pribram describes a fatal form of general sepsis which he ascribes to an anaerobic bacillus containing spores which attacks wounded territories of the body following shot injuries. His observations were made at the battlefield. This anaerobic form of sepsis is characterized by extensive, brawny induration and emphysema by early clotting of the blood and rapid thrombosis of the blood vessels. The latter he regards as more characteristic than the formation of gas. Large incisions into the affected parts fail to produce bleeding and the helplessness of the organism to resist the infection is, according to Pribram, due to this failure to bleed. There sets in high fever and very urgent dyspnea. This is produced by the acid intoxication resulting in turn from the formation of carbon dioxide in the circulating blood from the anaerobic organism. Just before exitus, the temperature becomes subnormal, euphoria is present and the pulse sinks rapidly. Occasionally liver atrophy is observed and the autopsy reveals foaming blood in the right ventricle and gas bubbles in the coronary arteries. The most extensive induration of muscles is encountered. In scarcely any other surgical condition are we so helpless as in this form of anaerobic septicemia. Perhaps serology will offer some hope of relief from this otherwise fatal form of sepsis.

X-ray Picture of Gas Phlegmons. (*Gasphlegmone im Röntgenbild.*) B. Döhner, *Muenchener Medizinische Wochenschrift*, September 21, 1915.

Döhner found, as did Martens and Finkh, dark spots in the *x*-ray picture of gun-shot wounds, indicating the presence of gas phlegmons. He cites a case of a soldier who received a shot wound in the thigh, in whom, 20 hours afterwards, the *x*-ray revealed two dark shadows. Operation exposed a deep-seated, foul-smelling gas phlegmon about a hand breadth under the skin and fragments of clothing surrounding the bullet close to the femur. The wound had shown no alarming evidences, nor was the track made by the bullet particularly diseased. The patient made a good recovery. In view of the dangerous course of gas phlegmons Döhner recommends the use of the *x*-ray for diagnosis early in every case of shot-wound. He urges this is just as important as early antitetanus vaccination.

Concerning Shot Injuries of the Abdomen. (*Ueber Bauchschussverletzungen*) SURGEON GENRAL PROF. DR. KRASKE, *Muenchener Medizinische Wochenschrift*, September 28, 1915.

The results of 39 cases of bullet wounds of the abdomen encountered in the course of six weeks are detailed by Kraske. His communication is in the form of a letter to a friend in charge of a field sanitary garrison on the eastern front. In the main he pleads for the earliest possible operation in every case. A spontaneous cure he claims never to have seen. Of the cases he operated 9 were available during the first 12 hours of their injury; 2 died and seven were discharged cured. Of the second series, *i. e.*, the second 12 hours, there were 21 patients, of whom 10 died and 11 were discharged cured. In the third series of the third 12 hours there were 8 cases, of whom 6 died and 2 were saved. The fourth series consists of one case, which died. The injuries were chiefly multiple, and were lodged in the small intestine 18 times, stomach 5 times, caecum and colon ascend, 11 times, colon transv. once and colon descend. and flexura sigmoidea 4 times. In several cases the projectile passed through the liver into the lung, injured the pelvis bones, and in one instance even shattered the humerus. The openings into the gut or stomach varied from a pin point to one admitting the finger tip. In the vast majority of the cases there was free air fluid and alimentary contents in the peritoneal cavity. All wounds were sewn over, care being taken to provide against stricture formation. In a number of instances resection of portions of the gut had to be done. In still another the endangered portion was eventrated and was treated at a later stage. Whenever possible the abdomen was sewed tight, even in cases where the peritoneum was inflamed. Irrigation was practiced in every case. Kraske lays much stress on the value of this measure. In a number of cases tube and gauze drainage to suspicious areas were introduced. His general results were 51.3 per cent. cures, which he claims is not an unfavorable figure, considering all the circumstances in this class of emergency surgery.

The Management of Pneumothorax Occurring as a Complication of Nephrectomy. W. C. QUINBY, Baltimore. *Journal American Medical Association*, December 18, 1915.

Quinby remarks that in cases demanding nephrectomy, conditions are often found external to the kidney which render it very difficult to avoid unintentional opening of the pleural cavity, even by experts. It may even occur during an operation of the so-called subcapsular type. It is most liable to occur when the perirenal tissue has been greatly infiltrated with inflammatory products causing adhesions to the diaphragm, especially on the left side where the kidney is normally higher. The rent of the diaphragm is most apt to occur at the upper angle of the lumbar wound by traction either on the retractor or on the kidney mass, while endeavoring to deliver the upper pole. A rudimentary twelfth rib may also favor the accident, and examination of the ribs before the operations, either on the patient or by a roentgenogram, is advisable. While the pneumothorax caused is usually slight in amount and not dangerous unless infected, it may be serious, and this depends on the size of the opening. If no adhesions are present the lung collapses. But if the hole is smaller than the cross section of the trachea it will only collapse slowly and the rent will probably have been recognized and closed. Where the wound in the pleural sac is so large as to allow free action of atmospheric pressure, that is, larger than the cross section of the trachea, phenomena may follow that endanger life. The air enters rapidly and there is a continuous positive pressure on the wounded side, causing the mediastinum to bulge forward and from the well side with each succeeding respiration and the active lung cannot expand sufficiently to meet the demand and dyspnea and cyanosis of increasing severity follow. Such consequences are not very frequent, but Quinby advises in all cases the restoration to normal condition as soon as possible. If the lesion is a large one and alarming signs appear, a forceps such as used for a sponge carrier or one with moderately blunt bite, should be pushed into the chest and grasp the collapsed lung With steady moderate traction on this, the mediastinum may be supported and the involved lung given a chance to carry on respiration until the tear can be sewn small enough to relieve the symptoms. Then the forceps can be removed and the sewing finished. A small tear should also be closed as soon as discovered, and if there is time enough a bit of fat or muscle tissue be tucked over the suture. Before the final dressings are applied after removal of the kidney and if insufficient ventilation persists the air in the chest should be removed by aspiration. This is best done by puncture low on the side in the midaxillary line of the thorax. The trochar should be slanted to correspond with the arching diaphragm and suction be made until a manometer attached to the aspirator shows a negative pressure of minus 7 to minus 10 mm. of mercury. This is important because it not only reexpands the lung but may also limit infection by confining the germs by the plastic apposition of visceral and parietal layers of pleura.

A Case of Intermittent Ileus Associating Wandering Kidney. (*Ein Fall von intermittierenden Ileus bei Wandernire.*) HÜGELMANN, *Münchener Medizinische Wochenschrift*, August 17, 1915.

A patient 45 years of age complained of repeated attacks of pain on the right side of the abdomen, vomiting for several days of bile and gastric contents. Examination during the attack would reveal a tumor mass in the neighborhood of the gall bladder of the size of a fist. Slight icterus, which was present each time, confused the diagnosis of a suspected loose kidney. The tumor mass would get smaller after the attack. Laparotomy revealed an atrophic kidney adherent to the reduplication of the hepatic peritoneum and the horizontal inferior portion of the duodenum. The kidney was removed when the attacks of colic and vomiting ceased. Hügelmann explains the symptoms by assuming that there was a stricture of the ureter near the kidney pelvis, caused by its peculiar location, a temporary hydronephrosis resulting which in turn compressed the duodenum. When the kidney was relieved the gastric symptoms would also stop.

The Treatment of Venereal Bubos by the Roentgen-Rays. (*Behandlung der Venerischen Bubonen mit Röntgenstrahlen.*) KURT KALL, *Münchener Medizinische Wochenschrift*, October 19, 1915.

Kall recommends Roentgen ray application in fresh bubo of venereal character and asserts that in the vast majority of such cases before suppuration has set in a rapid resorption and cure may be obtained He uses one-sixth the thickness of the aluminum filter ordinarily used for deep ray therapy, i. e., only one-half millimeters and one-half the focal skin distance. After one application of 10X the bubo is seen to be very much smaller and more important still is the disappearance of the pain. After two to four treatments complete resorption takes place When fluctuation has set in the Ray application may also induce resorption. After abscess formation a small incision followed by Roentgenization shortens convalescence

Gummatous Cervical Adenitis: Its Relation to and Mistaken Diagnosis for Tuberculous Cervical Adenitis. W. P. CONES, Boston. *Boston Medical and Surgical Journal*, November 18, 1915

Cones remarks on the strange rarity of syphilitic cervical adenitis, and the difficulty of making a differential diagnosis between tuberculous and syphilitic adenitis. Even with the microscope the diagnosis is often difficult. Cones reports four cases, in all of which certain data led to the suspicion that the glandular swelling might be syphilitic. Specific treatment was either of profound benefit or curative Cones concludes: "Cases of cervical adenitis supposed to be tuberculous, yet not quite characteristic, should be regarded as possibly gummatous, and careful study with all the means at our command should be made to prove or disprove this supposition definitely."

Bladder Tumors in the Young. R. F. O'Neil, Boston. *Boston Medical and Surgical Journal*, December 9, 1915.

Bladder tumors are rare in the young. Nearly all of the reported cases are of the connective tissue type. Epithelial tumors for all practical purposes do not occur in the earlier years. The vast majority of such tumors are sarcomata, and are polypoid in type and arranged in clusters. They start in the mucous or submucous coats of the bladder, generally from the trigone. They may be single or multiple, usually the latter. They tend to recur very rapidly after removal, but do not form metastasis. They may invade the surrounding structures. Difficulty in micturition is usually the first symptom. The prognosis is very grave; all the reported cases thus far have proven fatal.

(These tumors resemble in every detail the so-called grape sarcomata of the vagina that have been described by gynecologists. These sarcomata also are confined exclusively to children.)

Urea as a Bactericide, and its Application in Treatment of Wounds. W. Symmers and T. S. Kirk. *The Lancet*, December 4, 1915.

Prof. Symmers discovered some years ago that urea killed microorganisms in their culture media. Added to albuminous material like tuberculous sputum it inhibits the growth of practically all the organisms. It also acts as a bactericide in the presence of blood. It is therefore recommended as a treatment for surgical wounds. Its harmlessness has been shown, since it caused no damage when sprinkled pure on Thiersch skin grafts, or when one and a half drams of powdered urea were placed between the fragments of a fracture which was plated and the wound closed.

During the present war excellent results have been obtained by the use of urea as a disinfectant for wounds, the only disadvantage being that it causes some pain. The drug is used in the solid form as a dusting powder. It is non-toxic. By its use at least half the labor necessitated by other methods of treatment is saved. Processes of repair are not retarded. It should make an excellent first-aid dressing.

The End-Results of Seventy Cases of Renal Tuberculosis Treated by Nephrectomy. E. Granville Crabtree and Hugh Cabot, Boston. *Surgery, Gynecology and Obstetrics*, December, 1915.

Crabtree and Cabot state that young individuals with early lesions of the kidney which usually show considerable cortical tuberculosis and perinephritis do less well after nephrectomy than those of more advanced age in whom, however, the disease is often more extensive. The reason appears to be the extent of acquired immunity. The practicability of artificial immunization of these individuals demands consideration. Male patients offer more difficult problems in treatment than female, and the prognosis is less favorable.

Sixty per cent. of the authors' cases can be considered cured. In ten to fifteen per cent. of the cases the progress of the disease will not be checked by nephrectomy.

Sinus formation does not seem to be influenced by drainage. In undrained wounds sinus development appears late.

Studies in Gonococcus Vaginitis. Mary E. Trist and John A. Kolmer, Philadelphia. *Archives of Pediatrics*, November, 1915.

This paper is devoted to a discussion of the value of vaginal washing in the diagnosis of gonococcus vaginitis. The method consists in injecting 2 to 4 drams of 1:4000 mercuric chloride in normal salt solution into the vagina by means of a sterile eye syringe. The fluid is then sucked back into the syringe and squirted into sterile centrifuge tubes. After centrifuging the sediment is examined microscopically after staining by gram. The authors advocate the use of this method especially in chronic cases and in cases under treatment, where it gives a much larger percentage of positive findings than when the usual method is employed. In subacute and chronic vulvovaginitis with scanty discharge vaginal washings will disclose gonococci in from 20 to 25 per cent. of cases when direct smears are negative, the percentage of positive findings is increased after irritation of the vaginal mucosa with silver nitrate after the method of Norris. The absence of gonococci in vaginal washings gives greater assurance of the absence of gonococci infection and treatment guided by these examinations is likely to be more thorough, although greatly prolonged.

Double Episiotomy During Labor. John Phillips, London. *The Lancet*, November 27, 1915.

The author is of the opinion that this operation, which consists in nicking the vulvar outlet during labor, is of distinct value. He has performed it 156 times. In none of the cases did untoward symptoms arise. The indications for the operation are as follows: (1) An exceptionally large head. (2) A long and rigid perineum. (3) Atresia of the vagina. (4) A threatened central rupture of the perineum. (5) An unreduced occipito-posterior presentation, where restitution is impossible. (6) In breech cases in which the after coming head has to be rapidly delivered. (7) A narrow pelvic arch, as in the "male" type of pelvis.

End-Results in 242 Cases of Simple Fracture of the Femoral Shaft. Sergeant Price Martin, Rochester, Minn. *Surgery, Gynecology and Obstetrics*, December, 1915.

The writer says that in children fractures of the shaft of the femur involve mainly the middle third, and ninety per cent. of all cases are followed by complete recovery. The average period of treatment in bed and with crutches, splints and bandages is two to three months.

In adults, fractures of the shaft of the femur involve mainly the middle third. In the absence of shortening there may be a lasting weakness of the leg and thigh. Permanent disability is as a rule associated with shortening, and is to an extent proportionate to the degree of shortening. The average time in bed with crutches, splints and bandages is eight months.

Among adult laboring men 90 per cent. never become able to perform their regular occupations, while among those not of the laboring class the majority are able to do so.

Efforts for obtaining better results in adults should be directed to: (a) the employment of more weight in procuring extension, in the effort to entirely overcome the deformity; (b) early resort to open operation if extension seems ineffective; (c) the systematic use of massage and passive motion continued for months; (d) a longer use of crutches than is now customary; (e) education of the patient.

Chauffeur's Knee. G. F. Boehme, Jr., New York. *New York Medical Journal*, December 11, 1915.

The patient complains of pain in the knee. Flexion and extension of the knee (usually the right one) is limited and painful, and the patient is cognizant of a grating in front of the knee. On each side of the patella there is a fluctuating swelling due to a bursitis of the subtendinous bursa lying between the tendinous expansion of the quadriceps and the periosteum of the patella. Boehme explains the mechanism of the lesion as follows: In the cramped position, flexion and extension of the knee occur in shifting the pedals. Treatment consists in rest and wet dressings; later passive movements with massage and baking.

Disinfection of Septic Joints. F. J. Cotton, Boston. *Boston Medical and Surgical Journal*, December 16, 1915.

Cotton deprecates the conventional method of treating septic joints by extension drainage. His experience with this method has been very unsatisfactory. He has evolved therefrom the following method which has given him nearly always perfect results: The joint is opened; irrigation for fifteen minutes with 1-15000 corrosive sublimate solution; then a water-tight closure of the capsule in such a way as to leave the synovial membrane cut edge to cut edge. The external wound is left wide open, or nearly so. Cotton has treated about two dozen cases by this method, and has obtained a failure but twice. In one a fair result was obtained; in the other ankylosis developed. Cotton does not attempt to give a definite rationale for his method. This method has thus far been applied only to joints that have a distensible capsule. In closed joints, such as the hip, shoulder, ankle, etc., he has not worked out his method. In such joints the formalin-glycerin method of Murphy may be employed.

A Further Study of Bone Grafting.

Clarence A. McWilliams, New York. *Long Island Medical Journal*, December, 1915.

From a study of annual experiments and operations on human cases the author draws the following conclusions:

“1. If the periosteum be excised from over an area of bone and a section of bone within this area going into the medullary cavity, be removed (not, however, involving the whole diameter of the shaft) and the endosteum scraped away as well, then it is found that the cavity fills in perfectly with new bone, which of necessity comes from the old bone alone. See Fig. II.

2. If a section of the whole diameter of a bone be removed, then the bone will regenerate between the ends of the fragments, if the whole or a part of the periosteum be preserved, bridging the defect.

3. If a section of the whole diameter of a bone be removed, very little subsequent filling of this defect by bone will take place if the entire periosteum has been removed from between the ends of the fragments. See Fig. II.

4. Provided a graft be living and taken from the same patient, its future life depends on an efficient blood-supply, irrespective of the periosteum, or whether it is in contact with living bone or not.

5. Every graft made by the author which was transplanted with some of its covering periosteum lived, except one. Thus, of twenty-six transplantations twenty-five, or 96 per cent. survived. Of the one graft which died, it may be said that it was uncertain how much periosteum was on it or whether there was any at all.

6. Of the uncertainty of grafts made without periosteum surviving it may be said that of thirty-eight transplantations made without periosteum, twenty-one, or 55 per cent., lived while seventeen, or 44 per cent. died. From this we argue that since one can never know in advance which graft without periosteum will survive it is always wisest to transplant grafts with periosteum.

7. Periosteum when transplanted alone into the soft parts may produce living bone.

8. Contact with living bone is not at all necessary for the subsequent life of grafts as has been maintained by Murphy. My experiments settle this point.

9. From a consideration of all the foregoing facts, the conclusion seems irresistible that bone grafts of whatever size, if one is to be positively sure of their surviving, must be transplanted with as much of their periosteum as is possible; otherwise we may expect the grafts to die in about one-half the transplantations made without periosteum.

10. A bone graft should always be obtained from the individual who is to be grafted. Otherwise the changed serological relations may cause absorption of the graft. Animal bone should never be used, nor dead human bone. These simply act as unirritating foreign bodies.”

Finger and Hand Infection Amongst Physicians, an Urgent Warning.

(*Finger und Handinfektion bei Aerzten, eine dringende Warnung.*) Prof. D. L. Heidenbain. *Muenchener Medizinische Wochenschrift*, October 26, 1915.

Billroth's doctrine of rest to the infected part as prophylaxis against serious systemic infection has impressed itself so strongly on the author that after thirty years of active surgical work, he has taught and practiced the teaching of the master. This consists of putting a moist dressing on the wounded finger or hand and letting it rest in a sling for 48 hours. No use or activity of any kind is permitted. Motion more than anything else spreads the infection. A number of illustrative cases are cited where medical colleagues suffered severe and in some instances fatal outcome because of the failure to obey this injunction. Heidenbain himself after a long surgical career with many finger punctures encountered during operation without resulting infection, finally suffered from a serious phlegmon of the hand because he did not or was not able to observe this old, well tried maxim taught by Billroth.

An Improvement upon the Gritti Amputation.

(*Verbesserung der Gritti Amputation.*) Prof Wilms, Heidelberg. *Deutche Medizinische Wochenschrift*, October 21, 1915.

Wilms holds that it is a great advantage to have a broad end to a stump in order that there may be an anchorage for the artificial limb. The exarticulation at the knee would serve this purpose ideally, but, unfortunately, in most instances, the skin flaps cannot be made large enough to cover the stump. Wilms modifies the Gritti amputation in such a way that instead of sawing through the femur above the condyles, the division is made two or two-and-a-half cm. below; in this way he obtained the breadth in the stump that he desires. In order to be able to bring the cut surface of the patella over the flat surface of the divided bone, he divides the quadriceps tendon. Wilms suggests various ingenious methods to make broad stumps in amputations of other bones.

Lung Abscess and Bronchiectasis from a Surgical Point of View; Certain End-Results of Acute and Chronic Empyema.

W. Whittemore, Boston. *Boston Medical and Surgical Journal*, November 25, 1915.

Whittemore reviews the surgical treatment of bronchictasis and reports his own experiences. He is inclined to be pessimistic and believes that the treatment of bronchictasis is still largely medical. The results of surgical treatment of lung abscess is more encouraging. Of 27 cases operated upon in the Massachusetts General Hospital since 1906, the mortality has been 25 per cent. He believes that intratracheal ether anesthesia should be used. It is much safer to do the operation in two stages, and quite necessary when the pleura is not adherent. At the first operation, a large skin and muscle flap is made, and portions of three or four ribs are resected; or the intercostal muscles are cut away. Two or three sponges are then laid against the exposed pleura and the muscle flap sutured into place. At the end of three or four days, when adhesions have formed, the abscess is opened.

Rectal Anesthesia in Thyroidectomy.

Walter Lathrop, Hazleton, Pa. *The Pennsylvania Medical Journal*, November, 1915.

Lathrop advocates the use of rectal anesthesia in operations about the face and neck. He reports 111 thyroidectomies in which a modification of Gwathmey's oil-ether method was used with excellent results.

Forty minutes before operation the following rectal injection is given: morphine gr. ¼, paraldehyde ʒii, ether and olive oil aa ℥i. This is followed by equal parts of oil and ether. The author claims that there is much less fear than when the inhaling method is used. The pulse and respiration remain, as a rule, normal. There is less tax on lung and kidney. Operations can be done without the knowledge of the patient. There have been no irritative rectal symptoms. Post-operative nausea is reduced to a minimum, as are gas pains.

Traumatic Asphyxia.

W. W. Livingston, Folkstone. *The Lancet*, October 23, 1915.

The author describes a very unusual case in a girl, aged 11 years, who had been knocked down by a motor-bus and imprisoned under the guard, which passed from the front to the back, with the object of preventing obstacles from getting under the rear wheels. On admission to the hospital the child was conscious, but collapsed. Except for a few minor bruises, the striking condition of the face was the important physical finding. The color of the face was livid. This was in striking contrast to the conjunctivae, which were bright red. The livid color stopped abruptly at the line of the clavicles. The buccal mucous membrane was darkened, also the tongue, which was swollen and protruded just beyond the line of the teeth. A detailed examination of the skin showed the discoloration to be due to innumerable punctiform spots, so closely set as to appear continuous, and not to any macroscopic extravasation of blood. On firm pressure the color faded somewhat, but did not disappear. Respiration was rapid and shallow, and a certain amount of air hunger was present. On the second day the color had spread a little, the affected area was swollen and the color deeper. Gradually during two weeks the condition completely resolved.

A very few somewhat similar cases have been reported.

The Importance of the Faucial Tonsil as a Portal of Entry in Tuberculous Cervical Adenitis.

B. C. Willis. Richmond, Va. *Southern Medical Journal,* December, 1915.

In a series of 29 cases of tuberculous cervical adenitis, 86 per cent. showed involvement of the tonsil. The tonsil need not appear abnormal macroscopically, for such tonsils may still show microscopic tubercles. The tonsil and adenoids should be suspected as atria in all cases of tuberculous cervical adenitis, except in those cases that have other demonstrable lesions about the head and neck. Early removal of a tuberculous tonsil frequently induces absorption of glandular involvement, and prevents or reduces the frequency of further systemic infection. Tonsillectomy is the operation of necessity. Necrotic glands should be drained. The best after-treatment should be carried out.

The Treatment of Empyema by Means of Tubes.

(*Empyembehandlung mittels Kanüle.*) Otto Rüdel, *Münchener Medizinische Wochenscrift,* August 17, 1915.

Rüdel claims that a silver canula placed in the intercostal spaces through the pleura may easily substitute rib resection for the drainage of pleural exudates. He punctures the pleural cavity first, then after a week or so, depending upon the course of the disease, under local anaesthesia he inserts a silver canula 10 cm. wide, 5 millimeters thick and 5 cm. long parallel to the ribs in the mid intercostal space. The canula is fastened by adhesive plaster and injection of alcohol and balsam peru in 2 to 3 ccm. quantities at intervals complete the healing.

The Appendix.

Chester Curtis Waller, Lyndonville, Vt., and Lewis Gregory Cole, New York. *Surgery, Gynecology and Obstetrics,* December, 1915.

The authors from a thorough fluoroscopic study of the appendix in children find that it is a specialized part of the cecum, and believe its relation, functionally, with the structures of the ileocecal region of no less importance. They have demonstrated within its musculature a definite sphincteric and peristalic function as observed both clinically and fluoroscopically. It is likewise apparent that in the normal appendix fecal matter is retained during quiescence of the cecum and adjacent viscera; i. e., from one period of digestion to another, and thus, inferentially, that these retained "fecal molds" (not long-retained, dried-out, or inspissated) may or do become, incidentally or purposefully, a culture medium providing automatically fresh bacteria for colonic digestion; in brief, that the appendix is a normal physiological "culture tube."

These children show a life history, in whole or part, as follows: Cross, peevish and colicky babies; later, gastric and gastro-intestinal disturbances, facial pallor, especially about the nose and mouth: esophageal, gastric and duodenal spasm, "belly and side-aches, bilious attacks, fever spells," nausea, sometimes vomiting, in fact all the typical evidences of the laity, attributable to "worms," nervous manifestations, frequently convulsions, unhealthy general appearance, acne, erythema, and other cutaneous suggestions of "autointoxication," all of which are of clinical significance, regardless of local pain or tenderness.

The Rôle of Oxyuris Vermicularis in the Etiology of Appendicitis and Allied Pathological Conditions.

Kwannosuke Suzuki. *Surgery, Gynecology and Obstetrics,* December, 1915.

The author says that in an appendix the oxyures may be harbored, not only in the lumen, but also in the mucosa and submucosa; this may occur without producing any clinical symptoms or any noteworthy anatomical changes. We sometimes encounter a case in which an appendix infected with oxyures is inflamed through a totally different agent. For this reason the origin of an appendicitis cannot be attributed to the worms, even though these parasites are found in an inflamed appendix.

Suzuki was able to ascertain that a true inflammation is provoked by the parasites when the latter have penetrated the wall of the appendix in large numbers, and that the traumatically formed fissure in the tissue is for a protracted period of time in connection with the lumen, thus offering the infecting agent a portal of entry. This type of the disease offers distinct histological data, for which reason it has been designated "appendicitis oxyurica."

Chordoma, With the Report of a Malignant Case from the Sacrococcygeal Region.

Henry Albert, Iowa City. *Surgery, Gynecology and Obstetrics,* December, 1915.

The author says that chordomata are tumors of interest because of their rarity and their origin from notochordal tissue; they are also of importance because of the clinical symptoms which they produce. Nodules of notochordal tissue, not exceeding a pea in size, are found in about two per cent. of all autopsies (Ribbert). These do not produce clinical symptoms and are not to be regarded as true neoplasms.

In two of the cases reported, the tumors appeared to be entirely independent of the vertebral column or base of the skull, suggesting their origin from rests of notochordal tissue displaced during the time of fetal development.

Open-Air Treatment in Surgery.

J. W. Markoe, New York. *The Journal-Lancet,* December 1, 1915.

Markoe briefly reviews some of the literature which has grown up on the subject of open-air treatment and exposure to sun-light. Following the pioneer work of Rollier, who advocated exposure to the direct rays of the sun in cases of bone and joint tuberculosis, others have proposed treatment various surgical conditions by the same means. Thus in the present war the wounded who have been treated in open-air field hospitals seem to have done better than those treated in closed wards.

Markoe gives the results of the application of open-air treatment to septic cases in the Lying-In Hospital in New York City. He shows that those women who were kept out on the roof of the hospital during their illness improved in a much greater number of cases than women with the same complaints not so treated. Thus, of the indoor patients there was 100 per cent. mortality in the 21 cases that were in the hospital more than five days, while on the other hand, there were 22 recoveries of the 35 treated on the roof more than five days.

The Technic of Neurolysis.

(*Uber die Technik der Neurolyse.*) A. Stoffel, Mannheim, *Deutsche Medizinische Wochenschrift,* October 14, 1915.

In the present war, Stoffel has had abundant opportunity to see practical or complete paralysis due to injuries of nerves. At operation, the nerve is usually found continuous, but at the seat of the injury there is a smaller or larger bulbous scar. Stoffel's method is the following: First, the thickened perineurium is dissected away. Then with much patience each individual nerve bundle is dissected out of the scar tissue. The dissection obviously beginning at the healthy end. Very delicate instruments and manipulation are necessary. The scar tissue in the interstices is dissected away. When this dissection is complete, the nerve is surrounded by a formalin-hardened artery of a calf and sewed in place. With this technic the results have been truly brilliant, as compared to those obtained by former methods.

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SOME RADIUM ACHIEVEMENTS.

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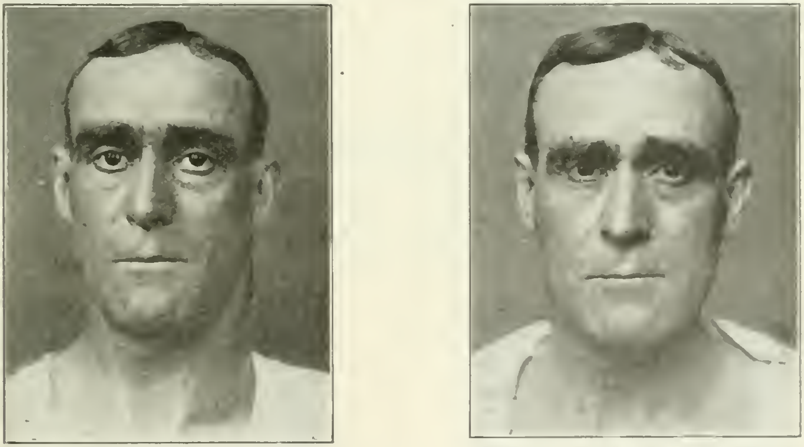
What will radium do? and what will radium not do? are two burning questions in the medical world today, the former of which I will try to answer briefly here.

What radium will do in the future with increased study and experience, is a different and a more difficult question. Those of us who are using radium every day in the treatment of cancers and of sarcomata, and of fibroid tumors and of uterine hemorrhages, hope for a great extension of the field of utility in this new field of radio-therapeutics, as great it may be or ever greater than the growth we have witnessed in the field of the x-ray which at first had no known therapeutic value but is now rendering such splendid service. Let me answer then this great question, "What is radium doing today?" Radium is useful in one way or another in almost every therapeutic field. I cannot therefore do more than set down a few of its notable achievements in the limits of a single article, giving here and there an illustration which will speak louder than any assertions I may make.

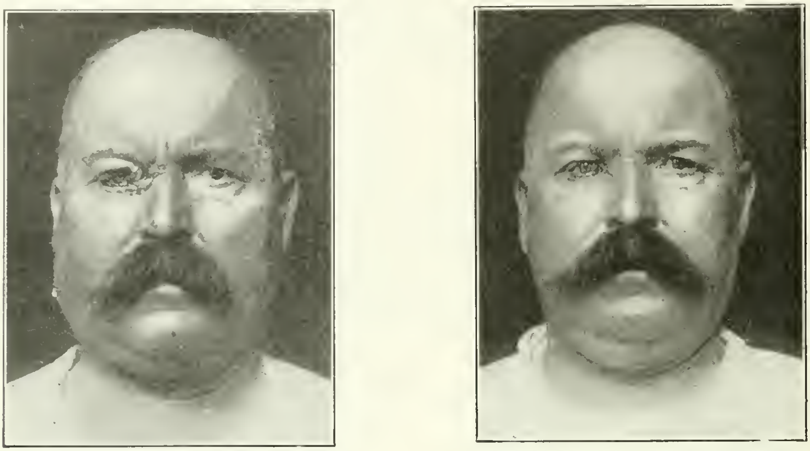
First and foremost, let me emphasize this great fundamental fact, which applies to radium as well as to surgical operations, that is to say *the earlier the case is seen the better are the results.*

We have treated over two thousand cases with radium but, alas, many of these have only come in the very last stages of their disease, but a short distance from the end of the journey. This was due to the fact that to the popular imagination there appeared to be something magical in radium with its mysterious physical properties. Nor did it do on the other hand to send out a general warning to our professional friends to stop sending these very advanced cases, for here and there even in this group occasionally one would get well.

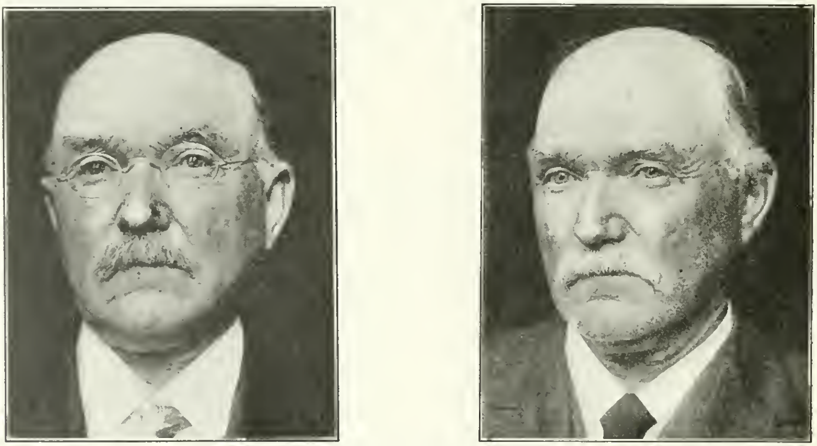


Figs. 1 and 2. Patient 45 yrs. of age, first seen May 16, 1914, complaining of lump on left side of neck. Diagnosis, Hodgkins' disease. He received one treatment May 17, 1914, 1619 mm., 6 hrs. No evidence of any disease July 1, 1914. No return to date. Photographs taken May 16, 1914, February 8, 1915.

Radium is not a remedy to be used all by itself. He who applies it must first of all have a broad medical experience and must be prepared to use every adjunct in making a diagnosis; let me briefly recapitulate some of our daily efforts. A careful history is followed by a careful examination of the patient from head to foot. Secretions are examined, and in all cases (unless there is a special reason given to the contrary) a Wassermann test is made. Occasionally a "cancer" is proven in this way to be a gumma and obscure nervous symptoms are cleared up. X-ray pictures are taken in all cancers of the breast and of the neck and in Hodgkin's disease (Fig. 1 & 2) and in lymphosarcomata, not to mention the systematic examination of the intestinal tract. A most careful pathological study is made of all available tissues before and after radiation.



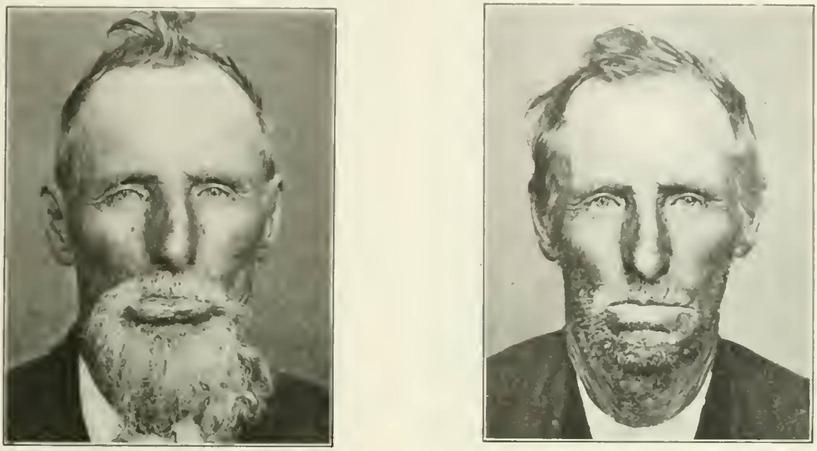
Figs. 3 and 4. Patient 50 years of age, first seen August 30, 1915. Diagnosis epithelioma of inner canthus of right eye with an ulcerative metastasis under right ear barely seen in picture. He received three treatments, the last November 17, 1915. Apparent complete recovery. No return to date. First photograph taken August 30, 1915, last November 17, 1915.



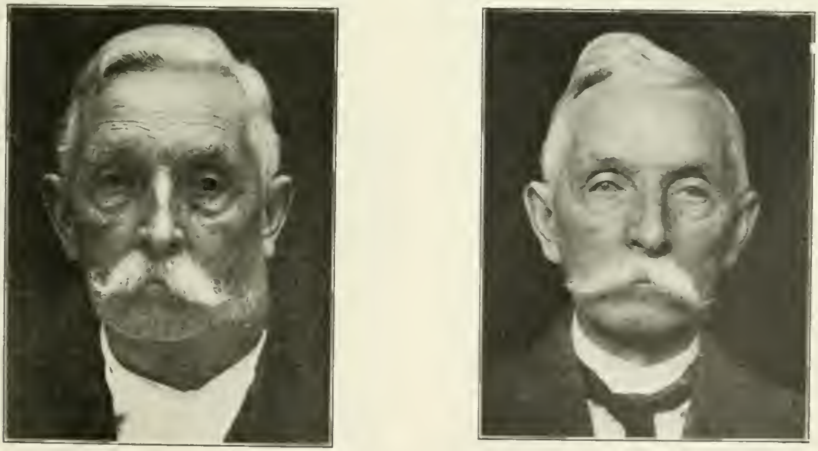
Figs. 5 and 6. Patient 61 years of age, first seen February 18, 1915, with an epithelioma of the nose. He received three treatments, the last one May 12, 1915. There has been no recurrence.

Let me now briefly recount some of the radium successes. I think the story cannot be too often told with thankfulness that radium cures basal-celled skin epitheliomata, especially those about the face, in over ninety per cent of the cases when seen early. Surgery will do this too, but what shall we say to the mutilation caused by surgery when a wide excision is made, or to the risk of return when the surgeon is over-eager to avoid deformity? I here present typical cases of this group of cancers cured by radium. Figs. 3 and 4 are from one of the inner canthus of the eye. Figs. 5 and 6 are of another involving the nose, and figs. 7 and 8 of one of the lower lip which presents a more difficult type.

When the disease extends onto and involves the mucous membrane of the nose or mouth or when it extends back of the ear and becomes adherent to the mastoid, although there may be marked improvement, the final results are not nearly so good. Of the mastoid group we have not yet seen a single cured case.



Figs. 7 and 8. Patient aged 62, first seen July 9, 1913. Diagnosis epithelioma of the lower lip. He received four treatments, the last one August 20, 1915. Final note states that there is no evidence of any disease left October 5, 1915. No recurrence to date. Photographs taken July 9, 1913; October 5, 1913.



Figs. 9 and 10. Patient 71 years of age, seen October 11, 1913, complaining of a large lump on the left side of his neck. Diagnosis, lymphosarcoma. He received one treatment of 734 mm., 23 hours and 45 minutes. Patient well to date. Photographs taken October 11, 1913 and January 10, 1914.

Cancer of the lip, if taken early, can often be eradicated; late cases are difficult to handle. I present here, however, a case treated and apparently cured.

Where the glands of the neck are involved they ought to be removed surgically.

Of cancer of the tongue we have had several apparent cures, but all early cases.

In cancer of the breast the best use to make of radium is to deal with recurrences. It never replaces surgery in operable cases. Some remarkable results we have seen in utterly inoperable cases, and in large recurrent nodules fixed to the chest wall.

Perhaps the best group of cases are the lymphosarcomata. Here radium would justify the outlay and labor involved even if it did no more than secure the remarkable results we are constantly witnessing in the disappearance of great tumor masses and in saving the lives of men in imminent danger of choking or starving to death, from the pressure of their conglomorate neck tumors.

Out of twenty of our cases, thirteen had been operated upon and all were advanced and most of them desperate risks (with one exception) and yet we were able to give entire relief to 65%. We do not believe that surgery is justifiable any longer in this group, for here surgery is at its worst with its practically invariable recurrences and radium is at its best with its rapid dramatic cures. I present photographs of a case with memoranda (figs. 9 and 10).

Several massive abdominal sarcomata have also shown an equally remarkable improvement (see fig. 11).

I would like to consider three classes of cases in the gynecological field: fibroid tumors, bleeding uteri, and cancers of the neck of the womb.

We have treated a large series of fibroid uterine tumors with these results in general—The menstruation can be stopped in about every case, the tumor can be checked in its growth, caused to shrink and even to disappear. In young women it is often possible to preserve menstruation. Our treatment is given by simply inserting the emanation of the radium on the end of a uterine sound well within the uterus. This causes no more pain than an examination of the patient. The progressive diminution of the tumor goes on for weeks or months.

Our position, then, regarding fibroids is this: If pressure symptoms are urgent or if there are complicating conditions such as lateral inflammation or ovarian cysts, operate. In all other cases use radium. It is astonishing how many patients we see with serious complicating conditions such as Bright's or heart disease, or diabetes which would render operation extremely hazardous or impossible. In these latter radium is, of course, supreme.

Bleeding uteri can also always be checked and in this way a radical operation avoided. This is one of the greatest of all the boons conferred by radium.

Now as to the great question of cancer of the cervix of the uterus. What can be done here? I give the statistics of 213 cases which Drs. Burnam, Lewis and I have seen and treated, lumping them all together.

These 213 cases were treated with radium between January 1, 1909 and January 1, 1915. Of these cases fourteen were operable and 199 inoperable or inoperable recurrent cases.

Of the fourteen operable cases ten patients were operated on and treated prophylactically with radium. Of these two have remained well for more than three years; one for more than two years; four for more than one year; and three for more than six months. In four cases of the operable group, on account of some general contra-indication, to operation, radium alone was used. All of this group are living and well; two for over three years and two for over one year.

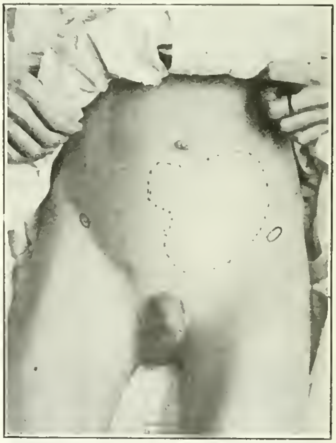


Fig. 11. A boy, 18 years old, first seen November 25, 1913, complaining of a large tumor filling the lower abdomen which was a sarcoma of the left undescended testicle. Photograph 455 taken November 26, 1913. He received 5 radium treatments, the last one April 6, 1914. The mass reduced by treatments to a tumor so small that it could be felt only through the rectum and not at all by abdominal palpation. He was then operated on by Dr. C. F. Burnam, April 25, 1914, when a rudimentary uterus was found with round ligaments and Fallopian tubes. In relation to these tubes there were two small testicles, the left of which was sarcomatous and was represented by the shrunken debris of the large tumor; the sarcoma was completely destroyed. Patient well to date.

The total number of inoperable and inoperable recurrent cases is 199, of which 53 patients have been clinically cured, 109 markedly improved and thirty-seven not improved.

Our series includes thirty-five cases of originally inoperable cancers of the cervix uteri or vagina in which the patients are clinically cured; two cases for over three years; four cases for over two years; 17 cases for over one year; 10 cases for over six months. It also includes 18 cases of originally inoperable recurrent cancers in which the patients are now clinically cured; in one case for over six years; in one case for over four years; in eleven cases for over two years; in ten cases for over one year; in five cases for over six months.

Excluding the ten operable cases in which we both operated and used radium, there are 203 cases left; in 57 of these 203 cases the patients are clinically cured. Of the 57 clinical cures, one has lasted for six years; three for over four years; four for over three years; five for over two years; 24 for over one year; 15 for over six months.

Our rules, then, are:

(1) Operate on every operable case, estimated as a good risk, as heretofore.

(2) Radiate from four to six weeks after the operation.

(3) Do not operate on borderline cases, but use radium first, for the disease practically always returns after operation in these cases, while many are curable with radium.

(4) Radiate all the advanced inoperable cases, for many of these too are curable, or can be shrunken down so as to become good risks.

(5) Where there are metastases up into the abdomen, radiation may give great relief and a temporary return to apparent good health but it will not cure.

Let me conclude by urging two things, first, that it is not enough to radiate and let the case go when apparently cured that is to say when all obvious disease is gone. All radiated cancerous cases must be kept under occasional observation for some years. A slight relapse is not infrequent and as a rule responds rapidly to another application of radium. Finally let me insist that while hoping for the great boon of a cure, we too constantly lose sight of the fact that even if radium never cured a single case it would still be one of our greatest therapeutic agents, in that it often gives such remarkable prolonged relief from pain, checks discharges, causes a cessation of foul odors and brings about a relief and general improvement with better spirits and appetite, and renewed interest in the affairs of life, a relief which is inexpressibly valuable even if it lasts only a few weeks or months.

Radium then has come as a most potent agent to enlarge a sphere of control over the worst of all diseases. It will do many things we have never been able to do before although it is by no means a specific, except in the lympho-sarcomata.

Cystoscopy in Uterine Carcinoma.

Every case of carcinoma of the uterus should have a preliminary cystoscopic examination of the bladder to determine the involvement that may or may not be present.—J. B. Percy, *Pacific Journal.*

A RATIONAL TREATMENT FOR (SMALL) FRACTURES OF THE GREATER TUBEROSITY OF THE HUMERUS.

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New York.
(From the 3rd Surgical Service.)

As I have elsewhere[1,2] pointed out, fracture of the greater humeral tuberosity is by no means a rare cause of shoulder disability.

Gross fracture of this tuberosity, produced by a definite external violence and marked by local ecchymosis, tenderness and pain (and often crepitus) is usually readily recognized. A small fracture of the tuberosity, produced by comparatively mild external or muscular violence, and unmarked by these localizing signs and symptoms, is not easily differentiated, clinically, from other varieties of shoulder disability, especially subacromial bursitis, and is, indeed, usually diagnosed roentgenographically. Since even a minute fracture of the tuberosity may be the cause of a "stiff and painful shoulder," the importance of roentgen examination of disabled shoulders is again emphasized.

That there is a close clinical resemblance between fracture of the tuberosity and subacromial bursitis is easy to understand. The bursa lies upon and is intimately related to the tuberosity and the spinatus tendons inserted into it. Associated with and probably provoking the subacromial bursitis there is, often, a tear of the supraspinatus tendon near the tuberosity. It seems reasonable to assume that a tear in the bony attachment of that tendon may equally be associated with or provoke an inflammation of the bursa. Incidentally, the roentgen shadow of a small fragment of the tuberosity may easily be mistaken by the inexperienced for that of a calcareous tendon deposit such as is often seen with subacromial bursitis.

The usual treatment of fracture of the tuberosity (when, indeed, it is recognized and treated as such) is fixation of the arm to the chest. *This I believe to be wholly wrong,* for it is almost always followed by a disability of the shoulder that usually persists for many weeks.

The proper treatment for these small fractures of the tuberosity—and for large ones if the displacement does not provide some other indication—is, in my opinion, ample abduction, at least to 90° and preferably to 120° or more.

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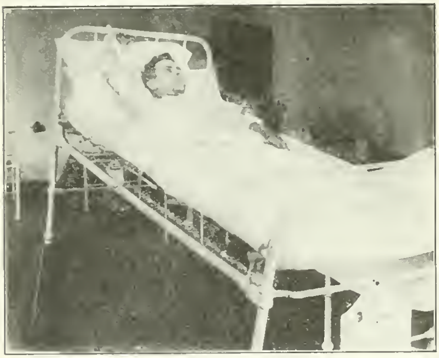
[1] Shoulder Disability (Stiff and Painful Shoulder). American Journal of Surgery, June, 1912.

[2] Shoulder Disability. A Further Study of Its Varieties and Their Treatment. Interstate Medical Journal, April, 1915.

Free abduction relaxes the supraspinatus which, otherwise, tends to pull upon the fragment; it relaxes and, as much as possible, it separates the walls of the overlying bursa which, reasoning by analogy with the tendon lesion, are probably apt to become adherent; it stretches the adductors of the arm, which obviates their becoming stiff; it maintains from the outset a large degree of active abductability—which, after the usual treatment, is not restored for many weeks.

The abduction treatment can be secured by means of a plaster cast or splint, but these have several obvious disadvantages: they are irksome and cumbersome to wear; they necessarily confine the patient to his home; they are not regulable from hour to hour; an anesthetic may be required to secure the abduction desired for their application.



If the tuberosity fracture is a large one, suggesting the need of fixation, abduction in a plaster cast is desirable, but for the small and minute fractures of the tuberosities I would recommend, instead, abduction by the simple, comfortable, automatic method which I have previously published[3] and which is here illustrated.

The patient is put to bed supported by pillows or a back rest. He abducts the arm, preferably rotated out, on the pillows, as far as he comfortably can. A towel or bandage loop is passed from the head of the bed to the elbow or wrist; and the head of the bed is then elevated on blocks or chairs. As the patient slides down, little by little, the arm is raised more and more, thus painlessly overcoming the spasm and *gradually* but surprisingly quickly securing full abduction. The method can be variously modified. Indeed, the mere rest of the arm on the pillows helps much to overcome pain and spasm and usually the patient will soon assist actively in the abduction. Strain on the arm can be lessened by propping pillows below it.

While I think it desirable in these cases to maintain the abduction fairly continuously for about ten days, this method allows the patient to attend to his affairs during the day, if he must, and to employ the treatment at night. It has the further advantages that the abduction can be regulated or intermitted by the patient himself, that it allows sufficient play of the muscles to keep them fairly supple, that it is simple and not uncomfortable.

THE OCCURRENCE OF ABSCESS OF THE LUNG AFTER TONSILLECTOMY; WITH A REPORT OF NINE CASES IN ADULTS.*

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New York City.

During the past six months six patients have been admitted to Mt. Sinai Hospital for the treatment of pulmonary abscesses that have followed tonsillectomy. Such a large series of cases in such a short period deserves some notice in these days when every tonsil is under the suspicion of being a possible focal infection in so many diseases of obscure origin.

As the result of the doctrine of focal infections the number of operations on the tonsils, especially in adults, has been enormously increased, and the change from the simple tonsillotomy to tonsillectomy has naturally necessitated a much more radical procedure in which general anesthesia is usually employed. The large number of these operations has undoubtedly led to carelessness, either in the performance of tonsillectomy at the public hospitals and dispensaries, or in the care of these patients before or after the operation. Either the patient is allowed to go home too soon, or, what is equally significant, these patients may not have been observed carefully before the operation. They may have had a little fever, or a cough, or some slight ailment which might easily have escaped notice unless a careful examination had been made at the time.

It is a striking fact that these post-tonsillectomy pulmonary abscesses do not occur in private practice. It is therefore difficult to escape the conclusion that there must be some radical difference in the way private and public patients are treated. It is a sad commentary to contrast the treatment of these two classes. Unfortunately much of this is unavoidable and is impossible of correction in view of the large number of these patients that must be cared for in the public hospitals and dispensaries. Until the required number of beds which are so urgently needed for these patients will have been supplied, the performance of tonsillectomy on public patients will always be unsatisfactory.

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[3] A Simple, Easily Regulable Method of Applying Abduction in the Treatment of Shoulder Disability. Medical Record, January 2, 1915.

* Read before the Section on Laryngology, New York Academy of Medicine, January 26, 1916.

The public and the hospital directors regard tonsillar operations as minor ones. But tonsillectomy, especially in the adult, is not a minor operation and demands much more attention to details than is usually accorded to it. These patients should have the same preliminary examination as patients who are to undergo major operations. They are also entitled to at least more after-treatment than is generally accorded to them. Three days in the hospital should be the shortest stay demanded for them. At the operation itself in dispensaries and some of the public hospitals much more attention should be given to the important details of the anesthesia, posture and the suction apparatus.

Abscesses of the lung should never occur if the patient has been properly treated. It is a poor exchange which the patient makes when he gives up a slight focal infection in the tonsil for the much more serious lung abscess.

Tonsillectomy is not a minor operation when such serious complications may occur after it. All the patients of the present series of nine cases were very sick. One died. One of them probably died, as he left the hospital against advice after only a week's stay, his condition at the time being very grave. One was sick for two years and recovered only after the resection of one of the lobes of the lung. Another required drainage of a pyopneumothorax. Thus the mortality of 11 per cent. (probably 22 per cent. if the case which was lost sight of is included) does not by any means tell the real gravity in adult cases.

In young children it is equally serious as shown in Bassim's[1] series of nineteen cases of pulmonary complications after tonsillectomy and adenoidectomy. Four of these nineteen patients died, 21 per cent. mortality. The pulmonary lesions that occurred were two cases of fetid bronchitis; seven of bronchopneumonia; five of lobar pneumonia; three of lobar pneumonia and gangrene; one of purulent pleurisy, probably due to rupture of pulmonary abscesses; one of abscess of the mediastinum.

That abscess of the lungs may follow tonsillectomy is well known. In a recent paper[2] I mentioned this relation and I also referred to Scudder's experience at the Massachusetts General Hospital[3]. Scudder has seen several such cases and he has also treated a lung abscess which followed a nasal operation. Cases have also been reported after adenoid operations; but these are very rare. That they do not occur more frequently after adenoid operations may be possibly explained by the fact that the operation is much shorter in duration and that the patients were children. The venous relations, too, may have some bearing in explaining this difference between adenoid and tonsillar operations. That they do occur is shown in Bassim's report of nineteen cases already referred to.

There is every reason to believe that these post-tonsillectomy lung abscesses are much more frequent in occurrence than the published cases would lead one to suppose. Thus Yankauer has recently seen four cases, and a very striking proof of this statement is afforded by H. A. Allen, of Indianapolis, whose remarks at the last meeting of the American Medical Association deserves quotation[4]:

"As a factor of safety, our attention should be called to one point in tonsillectomy. Nose and throat men have two procedures; local anesthesia is one and general anesthesia is the other. If you refer a child to a nose and throat man to have the tonsils removed and he uses a general anesthetic and allows one or both lungs to fill up with blood, you lose the child, and it puts a bad mark down both for the anesthetist and for the nose and throat man. I refer no case of tonsillectomy to a nose and throat man who uses general anesthesia unless he guarantees to me that the child's mouth and head will be held lower than the rest of the body. I feel rather emphatic on this point, because one year ago my right lung was filled and my left up half way, which only left me the upper half of my left lung for breathing purposes. I feel very fortunate in being able to be here today, as I had a serious attack of pneumonia following my tonsillectomy."

In attempting to explain the pathogenetic relations of these cases of pulmonary abscesses it will be of interest to note the difference in the time of the development of the symptoms. The symptoms appeared on the first day in two cases; on the second, third and fifth days in one case each; on the seventh day in two cases, and on the tenth and fourteenth days in one case each.

The same variation in the time of the appearance of pulmonary symptoms has been reported by Bassim in his series of nineteen cases of pulmonary complications in children. In one case the time was not noted. In the other eighteen the symptoms appeared on the first day in one; on the second day in eight; on the third day in five; on the fourth day in one; on the eighth day in two, and on the thirteenth day in one.

In the causation of these pulmonary abscesses there may be several factors concerned. These include:

1st. The anesthesia.

2nd. Aspiration of infected blood or of pieces of tonsillar tissue.

3rd. Embolism or infarction of the lung.

4th. Some special infective agent.

5th. Some antecedent cause, either local or general.

First, the possibility that these pulmonary abscesses might be caused by the anesthesia itself may be dismissed because the lung complications due to anesthesia are usually either an intense bronchitis, or pneumonia of either the lobular or lobar type. Abscess of the lungs is a very unusual complication of general anesthesia.

In passing, it may also be noted that the pulmonary complications which may occur after abdominal operations, for example, are the same whether the anesthesia is general or local.

Second: Aspiration of blood or pieces of tonsil tissue. This appears to me to be the most important cause. It is the actual factor in those cases in which the symptoms develop immediately or one or two days after the operation. It is also the possible cause in the cases in which the symptoms developed a week later, since a number of days may be required for the appearance of the local reaction in the lung after the lodgment of the aspirated matter.

Yankauer has bronchoscoped a number of these post-tonsillectomy pulmonary abscesses, but he has never found any pieces of tonsillar tissue or blood in them. This, however, does not disprove the possibility of an aspiratory origin, because the bronchoscopy was done very late, long after the time when the aspirated tissue might have been coughed up.

The aspirated blood or tissue may act in one of two ways. One, immediately by local action as an irritant foreign body, or secondly, by infection of the invaded area in the lung. In either case the aspirated substance is infected because the throat is a field of operation which it is impossible to sterilize and the number and character of the infecting organisms must necessarily vary in each case. Then, too, the patients who are subjected to tonsillectomy are usually sick. They either have diseased tonsils which require removal, or they have some obscure general condition in which the tonsils are suspected of being the focal cause. They are often of the lymphatic type and therefore their resistance to infection is low.

Third: Embolism or infarction of the lung. This is the other important factor. A large number of veins is always opened at the time of the operation and some of these may remain patent for some days after it. Yankauer has informed me that he has seen open veins, especially on the posterior pillar of the fauces, as late as three days after the operation. Thus septic emboli may readily be carried into the lung, either at the time of the operation because the field cannot be kept sterile, or they may be carried on some days subsequently through these patent veins. Still another source may be found in a septic thrombosis in some small vein in or near the field of operation. It is possible that septic emboli may be conveyed to the lung from these thrombosed veins.

While it is possible that embolism may be the cause of some of these abscesses yet, in my opinion, it is not as important as aspiration, because all of the cases of this series have been single abscesses only. If such abscesses were embolic in origin they ought to be multiple, as is the case in other embolic abscesses of the lung, such, for instance, as we see in post-partum sepsis. These embolic abscesses are almost always multiple. Indeed, the only instance of single embolic pulmonary abscess after uterine sepsis that I have ever seen is on my service at the hospital at the present time.*

Fourth: Some special infective agent. This is worthy of notice because three cases of the present series were admitted to Mt. Sinai Hospital within a period of six days, all of these patients having been operated upon at the same institution within a period of five days. Upon inquiry I have ascertained that these three operations were performed by three skilled surgeons. Case 2 was operated upon on July 22, 1915. Pulmonary symptoms appeared on the next day. Admitted to Mt. Sinai Hospital on August 14. Case 3; operation on July 26, 1915. Pulmonary symptoms one week later. Admitted to Mt. Sinai Hospital on

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*The terms "single" and "multiple" are used in the sense of single or multiple areas of the lung involved; the number of abscesses is not referred to.

August 16. Case 7; operation on July 27, 1915. Pulmonary symptoms appeared a week later. Admitted to Mt. Sinai Hospital August 10.

The occurrence of these three cases in such a short period in the same hospital must be more than a coincidence. Possibly future investigation may clear up the exact etiological relation of these three cases.

Fifth: Some antecedent cause either local or general. Among the local causes it may be mentioned that in some cases it has been reported that the patients had a slight cough before the operation and were thus predisposed to pulmonary complications. The general causes may include the effect of shock or the loss of blood, either of which may weaken the patient's power of resistance.

Granted that these antecedent causes may be factors, it would still be necessary to have some direct cause, such as aspiration or embolism to produce the lesions.

If we sum up, it will be seen that it is difficult to explain the pathogenetic relation of these cases just the same as it is difficult to explain the etiology of the pulmonary complications after abdominal operations. It is possible that several factors may be at work; in some cases aspiration of infected blood or tonsillar tissue; in other cases the process may be due to embolism from the local entrance of infection from open or thrombosed veins, etc. My own belief is that the chief factor is aspiration and the difference in the time of the onset of the symptoms is due to the variations in the infective agents, the size of the aspirated bits of tissue and differences in the local condition of the lung or variations in the resistance of the patient.

The number of cases of this series is too small to warrant a special analysis of the clinical features of this type of lung abscess. I shall therefore give only a brief synopsis of each case.

Case I. Woman, 26 years old. Two days after a tonsillectomy she was taken sick with fever and cough; dulness and râles were found in the left axilla. When she was admitted to my service ten days later she had dulness, bronchial breathing and crepitant râles in the left axillary and subclavicular regions. In the left base the breathing was diminished. Two days later the signs of abscess in the left lower lobe were unequivocal; but before anything could be done there was a sudden rupture into the pleural cavity which caused death in a few hours. Unfortunately no autopsy could be performed. The hospital record does not state where the operation had been performed or whether it had been done under local or general anesthesia.

Case II. A. K., female, age 30 years. Tonsillectomy under local general anesthesia at ——— Hospital. On the next day she had severe sticking pains in the left chest. These increased in severity and were associated with some fever five days later. There was muco-purulent expectoration which soon became offensive. On the ninth day vague chills, and the fever gradually rose from 103° to 104°. When she was seen in consultation with Dr. Roth after she had been sick for two and a half weeks the fever was 103°, respirations 30. There were signs of consolidation extending from the angle of the scapula to the left anterior axillary line; the fremitus and the breathing were much diminished and numerous loud, moist râles could be heard. The *x*-ray examination which was made after her admission to the Mount Sinai Hospital showed a large circular shadow, about 2½ inches in diameter in the left lung opposite the 4th and 5th anterior interspaces. In the upper portion of the shadow there was a lighter area, possibly due to a cavity.* Diagnosis: Abscess of lung.

One week later bronchoscopy was performed by Dr. Yankauer. Bronchoscopy in the left bronchus distinctly showed pus in the upper lobe branch; but there was none in the lower lobe branch. The bronchi were not dilated, and no foreign body could be seen.

She stayed in the hospital for two months. On her discharge the expectoration had ceased, and the physical examination showed only an indurated area at the site of the abscess. The roentgenogram showed a dense shadow occupying the position of the abscess.

Case III. A. F., female, 25 years old. Service of Dr. Alfred Meyer. Three weeks before admission tonsillectomy had been performed under general anesthesia at ——— Hospital. Two weeks after the operation she began to have chills and fever with sticking pains in the lower right chest. For some days she had had profuse muco-purulent offensive expectoration. The examination showed flatness in the right axilla from the 3rd space to the base. This flatness extended obliquely down toward the angle of the scapula. Over this area the respiratory sounds were much diminished; there were numerous loud bubbling râles. *X*-ray examination showed a dense circular shadow corresponding to the 7th and 8th spaces posteriorly. Diagnosis: Pneumonic process, probably about an abscess

After a month she left the hospital much improved. She had no fever, and the expectoration was much less and not offensive. The physical and *x*-ray examinations showed the infiltrated area to be smaller.

Case IV. A. F., female, 30 years old. Service of Dr. Alfred Meyer.

Four weeks before admission tonsillectomy had been performed at ——— Hospital. Immediately after the operation she became sick and feverish. Two weeks later she began to cough up thick offensive sputum.

The examination showed an area of dulness in the right lung in the 2nd and 3rd spaces extending from the sternum to beyond the midclavicular line. Over the outer portion the breathing was broncho-vesicular; over the inner portion it was almost bronchial with an amphoric quality. Fremitus was increased. Posteriorly over the entire subscapular region the breathing was diminished, being rough above, with increased whisper and fremitus. This area was flat to percussion; fine and coarse râles were numerous.

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* The *x*-ray examination of this series has been reported on (with plates) by Wessler in the *Interstate Journal of Medicine*, January, 1916.

X-ray examination showed a triangular shadow with the base towards the heart, apex toward the axilla in the right upper lobe in the 1st and 2nd spaces. Diagnosis: Lung abscess. Two weeks later, multilocular areas could be seen in the centre of this area. One month later the shadow had practically disappeared, and she left the hospital cured.

CASE V. J. L., male, 30 years old. Service of Dr. Libman. Five weeks before admission tonsils and adenoids had been removed under general anesthesia at ——— Hospital. One week after the operation he had had fever of 103° to 104° for one week. He expectorated considerable brownish material. He had a free interval of five days when the fever returned with the expectoration of much foul sputum.

In the right lung in the upper axilla there was a large area with a dull tympanitic note in the 2nd to 4th spaces; there was increased whispered voice with diminished vocal fremitus. Posteriorly there was some dulness over the supraspinous fossa and scapula with harsh breathing.

X-ray examination showed a fan-shaped, dense shadow beginning a little exteriorly to the hilus and extending into the axilla. Within this shadow a number of cavities appeared to be present. Diagnosis: Thickened pleura, probably consolidation and small cavities.

After a week's stay in the hospital he left against advice in an unimproved state.

CASE VI. N. R., male, 35 years old. Service of Dr. Alfred Meyer.

Tonsillectomy under general anesthesia at ——— Hospital, four months before admission. Ten days after the operation he began to cough up offensive muco-purulent sputum. He had severe sticking pains in the lower right chest at this time, and he also began to have irregular, remitting fever. This fever had continued; the attacks of cough and expectoration increased in severity and the sputum became more offensive. Recently he had pains in the ankles and knees.

Examination showed some clubbing of the fingers. In the right lung in the 2nd and 3rd spaces one and a half inches to the right of the sternum there was a large area of flatness with harsh breathing and moist râles. Posteriorly in the right midcapsular region there were the same signs as anteriorly.

X-ray examination showed a dense infiltration extending outwards from the root of the right lung. It began opposite the 3rd anterior intercostal space and extended to the mid-clavicular line. It was two spaces wide, and in the centre there was a cavity one inch in diameter. Diagnosis: Lung abscess. Three weeks later the examination showed that the infiltration had diminished considerably, and that the cavity was less evident.

The patient is still in the hospital, but he is greatly improved. There is no fever and the expectoration is very slight and odorless.

CASE VII. I. H., male, 30 years old. Service of Dr. Manges. Tonsillectomy performed two weeks before admission to the hospital. One week after the operation he began to have severe pain in the lower left chest associated with coughing and expectoration. On the next day he began to have fever. This became high and was associated with offensive expectoration.

The physical examination showed a large effusion in the left chest with air and fluid. Aspiration revealed pus. Resection of rib and drainage by Dr. J. Wiener resulted in a cure of the pyopneumothorax which had been caused by the rupture of a pulmonary abscess.

CASE VIII. R. K., female, 18 years of age. Service of Dr. Brill. Four weeks before admission to the hospital tonsils had been removed (no record as to type of anesthesia). On the same day she had chills and fever. Since then she had repeated chills and high fever; cough and pain in the right side appeared two weeks later. The expectoration was profuse and soon was very foul. The examination showed resonant râles of the right side. In the right upper lobe there was broncho-vesicular breathing with fine râles and bronchial voice. White blood cells 20,000.

X-ray examination showed a large infiltration of the right upper lobe with much fibrosis, probably a post-pneumonic lung abscess.

Remittent temperature between 99° and 104° persisted for several weeks when improvement began to appear. Ten days later the temperature became normal and physical signs of the abscess and the associated pneumonia infiltration became less marked; the sputum lost its foul odor and was much diminished in quantity. After a three months' stay in the hospital the lung signs cleared up entirely and the patient was discharged cured. The *x*-ray showed that the local process in the right upper lobe was very much diminished in size.

CASE IX. Mrs. B., 40 years old. Patient of Dr. Lilienthal. On February 10, 1914, tonsillectomy was performed at ——— Hospital under ether anesthesia. She was perfectly well for five days. Then she had a slight cough and on the sixth day she had pain in the right shoulder. No expectoration. Thirteen days after the operation small amount of yellowish foul expectoration, and a little fever appeared. Gradually the expectoration became more profuse and very foul. This continued for one and three-quarter years up to the time of her admission to the hospital. She had nine hemorrhages, nearly all of which were large. She also brought up cylindrical bronchial casts. She had constant pleuritic pain. There were two attacks of "pneumonia" with a temperature of 106°; otherwise the temperatures were of low grade.

On admission the temperature was 101°. The physical examination showed dulness over the right middle lobe; diminished breathing with numerous moist râles over the right middle lobe.

X-ray examination showed: "In the right lung corresponding in position to the right middle lobe, there is a dense irregularly triangular shadow, its apex situated at the right of the hilus, and extending upward to the axilla. The shadow extends vertically a distance of about two intercostal spaces, and seems to be fairly well demarcated from the normal lung as shown by the oblique examination. On the oblique view of this shadow, there is seen in its centre an irregular lighter area about two inches in length, probably a cavity. At the upper limits of the infiltration there is a dense linear band due to a thickening of the pleura. Right apex is poorly areated, although no definite infiltrations are seen in it. Right diaphragm is abnormally high and does not move very well on respiration. Upper mediastinum is somewhat pulled over into the right chest. There are some pleuro-phrenic adhesions on the right side. The Roentgen examination would indicate an infiltration in the right middle lobe, probably due to an abscess with pleural adhesions."

Operation by Dr. Lilienthal. The right middle lobe was solid; slight pleural adhesions were present. There was also thickening of the upper lobe along its mediastinal border. The greater part of the middle lobe was resected. The pathological examination showed a huge bronchiectatic abscess with surrounding infiltration. The patient made a complete recovery, the only complication being a bronchial fistula, which closed gradually. The sputum has entirely ceased and the patient is well.

In conclusion, I would urge that this series of nine cases of lung abscess after tonsillectomy should once more direct the attention of the hospital directors and the lay public to the fact that tonsillectomy is not one of the minor operations and that these patients should receive the hospital care to which they are entitled. It should also remind the hospital surgeons that the care of these patients before, during, and after the operation should be commensurate with the possible dangers.

72 East 79th Street.

1. Bassim: Les Complications Broncho-Pulmonaires Consecutives a l'Adenoidectomie et a l'Amygdalectomie Thesis de Paris, 1913. No. 181.
2. Manges: Non-Tuberculous Pulmonary Suppurations, their Medical and Surgical Relations. Journ. Amer. Med. Assn., May 8, 915.
3. Scudder: Boston Med. and Surg. Journal, Oct. 1, 1914.
4. Allen, Journ. Amer. Med. Assn., Sept. 28, 1915, p. 1096.

The most frequently found source of infection in deforming arthritis is generally conceded to be intestinal torpor and toxemia. The clinical history and physical tests may reveal the presence of congenital or inflammatory obstructive bands to explain long standing constipation, and here surgical measures alone can remedy the abdominal situation.—A. B. Hevish, *Journal of Therapeutics.*

OPERATIVE TREATMENT OF COMMINUTED FRACTURE OF THE LOWER END OF HUMERUS. A CASE REPORT.

G. W. Brock, M.D.,
Atlanta, Ill.

Fractures of the lower end of the humerus are divided, as to location, into: supracondyloid, T- or Y-shaped, epiphyseal separation, and fractures of the internal or external condyles and epicondyles.

When the fracture is due to great violence there may be so much comminution that the fracture fails to come under any of the above classifications.

According to the statistics of the Hudson Street Hospital, New York City, for the years 1894-1903, fracture of the lower end of the humerus had an incidence of .0153 per cent. in 12001 cases under treatment.

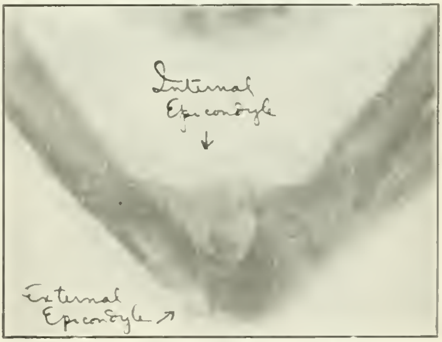

Fig. 1 Lateral position, [illegible]

After injury to the elbow, swelling occurs rapidly, which with the pain present often necessitates the administration of an anesthetic before examination for diagnosis is possible.

The swelling may be so great that examination and reduction must be delayed for three or four days. In the meantime the elbow should be enveloped in an aseptic dressing in the position of semiflexion, limiting motion with a temporary splint, and resting the injured arm on a pillow. The application of an ice-bag aids in the reduction of the swelling.

Whenever an apparatus is available, several roentgenograms should be made at different angles, as otherwise one may be deceived as to the amount of displacement present as shown by a single picture. If the plates are made and studied stereoscopically their interpretation is much more apt to be correct. It is very important that reduction of the fragments is accurate, the most common displacements being overriding and angular deformity, cubitus varus being much more common than the valgus position.

If the roentgen rays show that reduction is incomplete, and the subsequent usefulness of the joint be in doubt, the case should be considered one for open operation.

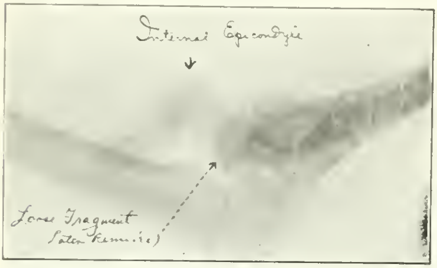

Fig. 2. Anteroposterior position, fourth day.

The question of position after reduction and subsequent motion in these joint fractures has brought forth much divergence of opinion; the positions advised embrace the range from acute flexion to complete extension, with the middle position in most general favor, the forearm being placed in a position midway between supination and pronation, and a splint being worn from five to six weeks.

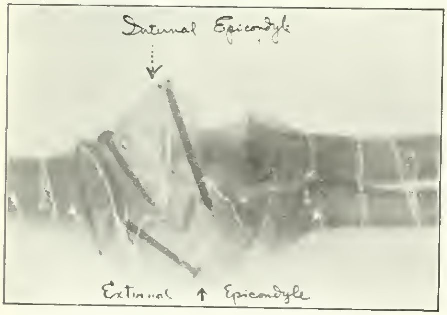

Fig. 3. Showing fixation of fragments with wire nails and silver wire, fifth day. (The white blurred lines are due to the plates baving been placed in paper envelopes before dry.)

The time at which passive motion should be begun varies with different observers from three to five or six weeks, with a preference for the earlier date. Very early and frequent motion is said to lead to an overproduction of callus.

The prognosis for fractures of the lower end of the humerus is fairly good except for those entering the joint, in which an excess of callus formation may occur, especially if reduction is inaccurate and the fragments not well immobilized. Bruns claims that in fractures entering the joint an excess of callus rarely forms; nevertheless the prognosis for complete restoration of function is bad, deformity and stiffness with partial or complete ankylosis being not uncommon.

Case Report.

M. A. J., Male, 26, an inmate of the Illinois State Penitentiary, Joliet. While working in the quarry May 26, 1915, the left arm was caught in a large flywheel of a heavy drilling machine which was accidentally started while being oiled by the patient.

A fracture of the left elbow was sustained, which was accompanied by pain, swelling and marked deformity with complete disability. Under light anesthesia there were found undue mobility and marked crepitation causing great pain whenever the parts were moved.

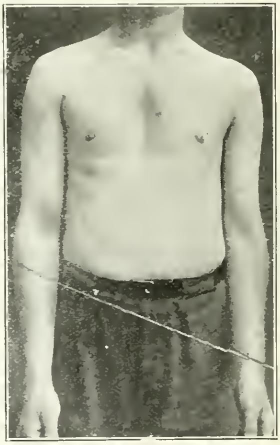

Fig. 4. Arm extended. Tenth week.

The epicondyles were both at a higher level than normal and rotated back of the elbow.

The arm was painted with tincture of iodine, half strength, and covered with an aseptic dressing and motion was limited by an anterior moulded plaster splint; and the patient was placed in bed with the injured arm resting on pillows for a period of four days, during which time the swelling persisted, discoloration extended over the lower two-thirds of the arm and numerous blebs appeared.

With some reduction in the swelling the patient was removed to a general hospital; where several skiagraphs were made and on the following or fifth day after the injury the fracture was reduced by an open operation.

Technic.—The field of operation was swabbed with tincture of iodine and the numerous blebs pricked and drained of serum leaving the epidermis as near intact as was possible.

A U-shaped flap was made 10 cm. in length completely exposing the para-articular structures.

The ulnar nerve was isolated and drawn out of the way by a gauze sling. The lateral ligaments were found to have been ruptured and the lower end of the humerus lay in three fragments.

The inner half of the trochlea and the internal epicondyle constituted the inner fragment, the line of fracture passing through the olecranon fossa and upwards on the shaft for a distance of two inches, the external epicondyle was detached, and the outer half of the trochlea lay loose in the joint cavity.

Blood clots were sponged out of the joint cavity with hot gauze sponges, the loose fragment was removed, and the internal and external fragments were fixed in place by three wire nails, which were supported by the addition of a silver wire encircling the lower end of the shaft.

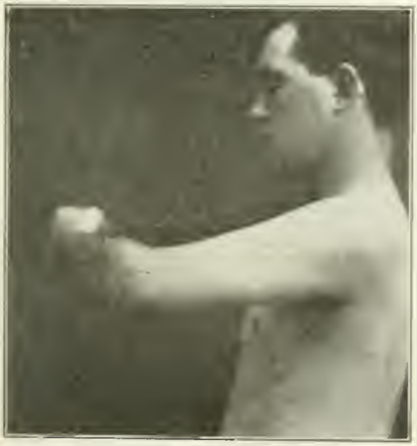

Fig. 5. Arm flexed. Tenth week.

The lower of the two nails fixing the trochlea and internal epicondyle bridged across the open space formerly occupied by the fragment of trochlea which was removed, the point being embedded in the capitellum.

The ulnar nerve was returned to its bed and covered with fascia, and flaps of fascia were swung down from the triceps muscle and stitched around the lateral aspects of the joint. The incision was closed with interrupted sutures.

The forearm was flexed at a right angle to the arm in supination, this position being maintained by an anterior moulded plaster splint. On the second day after operation a roentgenogram was made, and the patient returned from the general hospital to the prison hospital. The next day, the lower end of the flap showed an area of infection; respiration 24, pulse 128, temperature 104° F. The infection remained local, but a cutaneous area 5.5 x 8.5 cm. sloughed out and later healed over by granulation.

Owing to this local infection the cast was removed daily and dressings re-applied. Three weeks after operation passive movement of the joint was made under anesthesia through a range just short of full extension and flexion.

The arm was very painful for several days after this manipulation, but after a period of four days, passive movement was resumed and continued two or three times a week, first through a short range, then increasing the range of motion until at the end of six weeks the arm could be moved through a range of 45° and the patient was able to carry a bucket of water up two flights of stairs with the injured arm.

The accompanying photographs show the range of motion at the end of ten weeks.

The greatest discomforts experienced by the patient were due to the sloughing and later granulation of the flap, and a numbness of the fifth, and the outer half of the fourth fingers due to injury of the ulnar nerve.

Six months after the operation the two lower nails became loose. They gave the patient no inconvenience, but were removed, since their usefulness was past. As an osteoporosis not uncommonly occurs around nails or screws embedded in bone, their removal is not attended with much difficulty, and in this case it was done under local anesthesia.

If in doubt in these joint fractures an open operation is advisable using the most painstaking asepsis. Postoperative passive motion should be instituted early, supplemented by passive motion under anesthesia when necessary.

I believe the satisfactory result in this case is largely influenced by the determination of the patient to have a useful arm, as evidenced by a persistent endeavor at motion both passive and active.

Chronic Prostatitis..

In addition to changes brought about in the glandular substance itself by a continued prostatitis, there is another change which must be taken into consideration in discussing the urinary symptoms dependent upon prostatic inflammation, and that is a thickening of the urethral walls. It will be found that the walls of the prostatic urethra are infiltrated and the canal has lost a great part of its elasticity. Owing to the deposit of inflammatory products in the parenchyma of the prostate, the canal becomes fixed and, as a result, much of its contractile and propulsive power is lost. Further than this the patient has bladder symptoms, but they are of a mild grade; he will have to get up at night once or twice. He will also complain of decline in sexual vigor. This type of prostate is very easily recognized per rectum. The finger meets with a hard, flat surface of varying extent, but in most instances the inflamed gland is of good size, in fact, it may just be possible for the finger to outline its top and lateral boundaries.—Clarence Martin in the *N. Y. Medical Journal.*

METHODS OF TREATING OBLIQUE FRACTURE OF THE FEMUR WITH CASE ILLUSTRATIONS.

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Associate Surgeon to the Long Island College Hospital,
Brooklyn, New York.

The line of fracture usually runs from without, inwards and upwards, though the plane of this fracture is not always perpendicular to the front of the body and it may run from within, outwards and upwards. The displacement is angular, over-riding, lateral and rotary. Occasionally the fragments are displaced so that the surfaces opposite the fracture planes are brought into contact and, if this is not corrected, they will either not unite or become insecurely fastened and refracture. All methods of treatment should have in view a functionally useful limb.

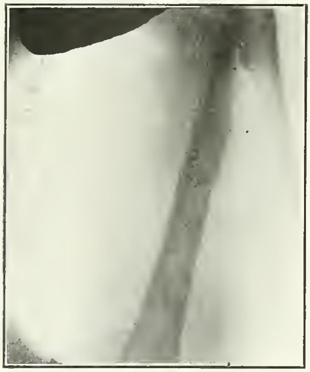


Fig. 1.

The closed reduction method is generally best obtained with Steinmann bone extension.

Case I. L. L., longshoreman, 32 years old, Norway. Was brought to the Long Island College Hospital in an ambulance. Family and previous personal history negative. While piling cases in a steamship hatch he fell 9 or 10 feet, his left thigh striking against a case.

Chief Complaint: Pain and inability to use his left leg. Examination showed discoloration of his left thigh, crepitus and a new point of motion at the middle of the left femur with 2″ shortening. X-ray picture showed an oblique fracture of the femur with lateral displacement and over-riding of the fragments.

The patient refused any open reduction method so Steinmann bone extension was applied as shown in Plates VII, VIII, IX and X, under anesthesia, after correction of the displacement. Coaptation splints were applied to the thigh, and he was placed on a fracture bed, as shown in Plate IX, where he remained throughout the treatment in perfect comfort. The fragments united as shown in Plate XI, in line, with some lateral displacement but no shortening. Plate VIII shows the pin passing through the bone. Plate XII shows the hole left in the bone after six months. This pin was removed in five weeks; it had become so loose that it was withdrawn with very little force, and the wounds healed rapidly.

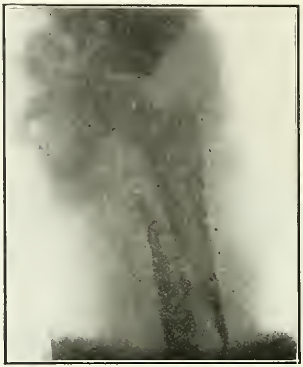


Fig. 2.

Case II. A. D., age 12, schoolgirl, U. S., fell and broke her right thigh obliquely in the upper third. A Lane plate was inserted as shown in Plate V, by the open reduction method and plaster of Paris was applied. When this plate was removed an angular deformity was found which had been produced during the application of the plaster cast on account of the insecure binding of the plate, although the picture taken soon afterwards showed perfect position in that one plane. The result was functionally satisfactory with only slight shortening and as the child was young nature finally covered up the deformity with the development of the femur.

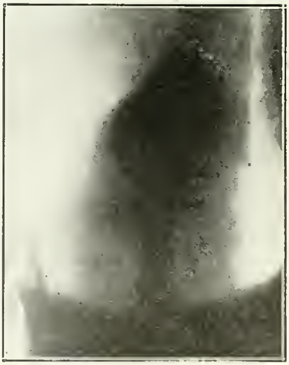


Fig. 3

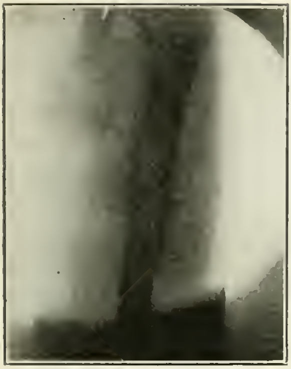


Fig. 4.

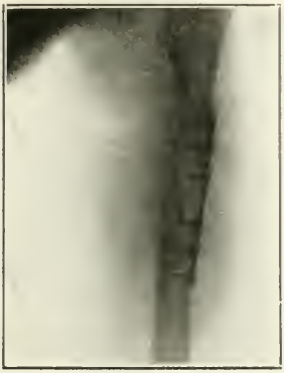


Fig. 5.

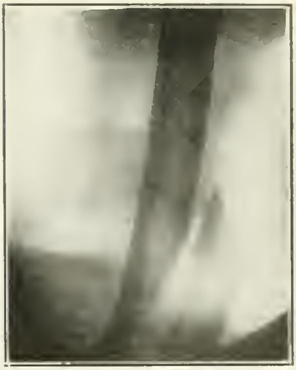


Fig. 6.

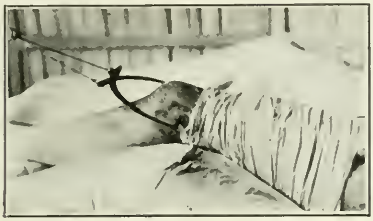


Fig. 7.

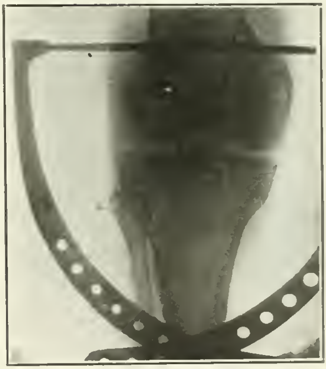


Fig. 8.

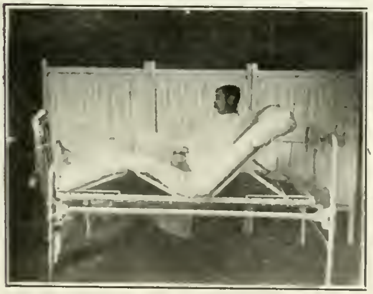
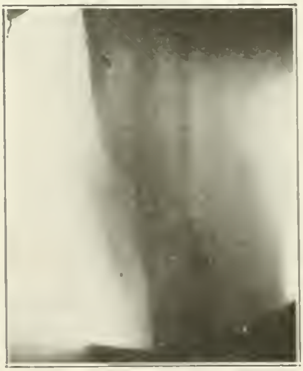


Fig. 9.



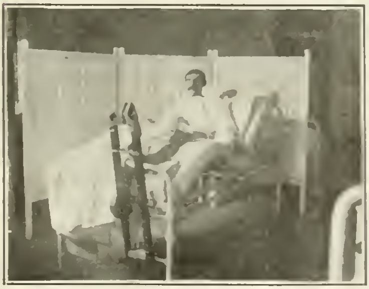


Fig. 10.

Fig. 11.

Case III. J. C., schoolboy, age 10, U. S., was brought to the Long Island College Hospital in an ambulance. Family and previous personal history negative. He was helping other boys move a heavy wagon when the shafts fell on his right thigh and broke the femur.

Chief Complaint: Pain and loss of use of right leg. Examination showed crepitus, deformity and a new point of motion in the upper third of right thigh. X-ray picture showed a long oblique fracture running from without, inwards and upwards in the upper third of the right femur.

Operation—Open reduction method. A long incision was carried down to the bone along the outer aspect of the femur, the fragments were placed in position and retained with a bone clamp; two drill holes were made through both fragments and screws were inserted so as to penetrate them, as shown in Plate III. These were left protruding from the bone so that they could be readily identified and the wound sewed up, the fragments held firmly together and the limb was placed in a cast. At the end of five weeks the screws were removed, union was firm and the fragments remained in line as shown in Plate IV. The child left the hospital with a perfect anatomic and functional result.

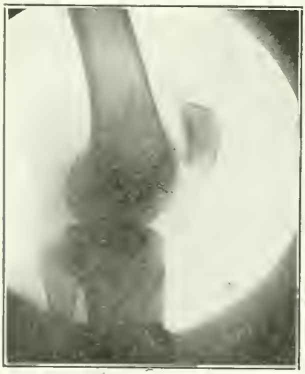


Fig. 12.

Conclusions: It is important to wait five or six days before undertaking the open reduction method. Oblique fractures are best secured with screws penetrating the fragments. All mechanical devices should be removed after they have served their purpose as they are foreign bodies and cause irritation. The best and the most accurate method of extension is by means of a pin through the bone so the pull is applied directly to the distal fragment (Steinmann).

Every patient should be advised as to the advantages and disadvantages of the various methods of procedure, and the surgeon should make sure that there is no latent disease that would contraindicate the open method.

SUPRA-PUBIC PROSTATECTOMY UNDER LOCAL ANESTHESIA.

R. L. Payne, Jr., M.D., F.A.C.S.
Norfolk, Va.

It is hardly probable that the removal of the prostate gland under local anesthesia will appeal to all surgeons. When we bear in mind, however, that the necessity for this operation always occurs in the aged, and in weak and feeble men, and that there often exist not only infection but also symptoms of renal and cardio-vascular disease, it behooves the surgeon to seek a means whereby the dangers of a general anesthetic and the shock from operative trauma can be eliminated.

Local anesthesia seems to fulfill these requirements because first, the general anesthetic is eliminated and second, the traumatic influences from the field of operation are cut off from the brain. In this connection we must remember that the brain is not asleep under a general anesthesia nor are the painful sensations prevented from reaching the brain and thereby contributing to shock.

In the type of case under consideration, prevention of post-operative shock is the chief consideration and here again local anesthesia is the remedy *par excellence* because hemorrhage is materially lessened by its use.

This is accomplished first by the mechanical principle of pressure from infiltration and second by the logical addition of small amounts of adrenalin chlorid to the anesthetic agent.

To Allen belongs the credit of developing the procedure of prostatectomy under local infiltration. I have slightly modified the Allen technic and the accompanying sketch, copied after Allen, will serve to show how the needle is guided to the various points of injection.

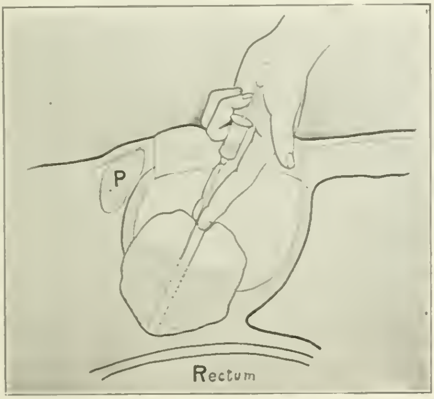
The various steps of the procedure are as follows: One hour before operation one No. 1 H.M.C. tablet is administered hypodermatically and fifteen minutes before operation a similar dose of one-half strength is given if the patient shows little or no effect from the first dose or there is a tendency to wakefulness and nervousness. I prefer this drug combination because of untoward effects personally observed from the use of scopolamin.

Allen recommends that with the initial hypodermatic injection there be given a suppository containing ten grains of anesthesin but I have been able to dispense with this procedure.

For the local anesthetic novocain 0.50 strength, to which is added ten drops of adrenalin (1-1000) to the ounce is the remedy of choice.

At the upper limit of the proposed incision the injection is begun. With a small needle, two inches long, the skin is punctured and a small amount of novocain solution injected. Then, with the needle vertical to the skin, it is advanced slowly while some of the solution is forced ahead until the deep fascia is reached. This point can be easily recognized if the needle is made to move slightly to and fro as it is advanced. The fascia is then punctured and just under it one half ounce of solution is deposited. A similar amount is then placed at the lower extremity of the proposed incision immediately above the pubis.

Between these two points the subcutaneous tissues are thoroughly infiltrated and finally a careful intradermal injection is made along the proposed line of incision.



The above illustration (modified after Allen) shows the technic of accurately guiding the needle to the various points of injection by the use of the fingers.

The parts may then be incised painlessly down to the bladder and here the syringe is again used to place about one half ounce of the anesthetic solution into the exposed fundus. Care should here be exercised not to go deeper than the submucosa; not on account of any possible danger but because the object would be defeated if most of the solution went into the bladder cavity.

After about three minutes elapse one can grasp the bladder with two towel forceps and open between these without pain.

The cavity may then be gently wiped dry without causing any discomfort other than the sensation of a desire to urinate.

Since any foreign body introduced into the bladder with much pressure always causes painful tenesmus, I have eliminated the use, at this point, of deep retractors as advocated by Allen.

The Allen technic further provides that at this stage a finger be inserted into the rectum by which the needle may be guided when injecting the anesthetic solution around the prostate.

As a substitute for these two details I prefer to introduce two fingers of the left hand gently down to the prostate without attempting any bladder retraction.

The needle is thus guided to the points of injection more accurately and without any discomfort to the patient.

Since the internal meatus and urethra is the most sensitive area of the bladder, this point is first chosen for infiltration and here again there is a slight variation from the Allen technic. A longer needle must be here substituted which should just puncture the mucous membrane and after infiltrating the meatus at two or three points the needle should then be advanced into the lateral walls of the urethra about 3/4 of an inch and more solution injected. With the guiding fingers the needle is then made to enter through the mucosa over the enlarged gland at the superior, inferior and lateral aspects. About two drachms should be injected at each of these points and then five minutes must elapse before beginning the enucleation.

A larger amount of solution may be injected without danger and it is better to use too much, within reason, than too little.

At this stage, if one is thoroughly familiar with the procedure of prostatic enucleation and will proceed in a gentle manner, the lobes may be removed with very little discomfort to the patient.

The minimum amount of hemorrhage following this procedure is striking and the near absence of shock afterwards lends attraction to a method which I believe is destined to greater popularity when surgeons at large become more familiar with the details of its execution.

Some Indications for the Use of Local Anesthesia.

Surgical procedures on extremely weak, ill or toxic patients should always be undertaken under local anesthesia if possible, because their sensibilities and reflexes are very much below par and they therefore make good subjects. The possibility of an after-coming acidosis is particularly imminent in this class of cases when ether or chloroform are used and the importance of local anesthesia from this standpoint cannot be too strongly emphasized. —R. L. Payne, in the *Charlotte Medical Journal.*

TECHNIC BY WHICH CONSERVATISM IS MADE POSSIBLE IN DISEASES OF THE ADNEXA.

P. Blaise Salatich, M.D.,
New Orleans, La.

The usual median incision is made, and long enough to thoroughly view the field. After inserting self-retaining or other retractors, we should study carefully the conditions that exist before attempting to free adhesions. Our aim must be to free the adhesions with great care and to create the least amount of traumatism, for here lies our most important step if we are going to attempt any conservatism. If our dissection is not carried out in this manner, structures that could otherwise be saved will be so broken up and ragged that conservatism will be almost impossible and these organs will be more fit for the bucket.

With this idea constantly in mind I have tried different technics and have found the following most successful: With the use of sponges arranged flat at the end of two or more sponge holders, the different structures can be separated with the greatest care and the least amount of traumatism. You can always see what you are doing and the fingers are not constantly in the cavity. This diminishes to a minimum the risk of entering a hollow viscus.

One or more sponge holders are used to separate the organs so as to find the adhesions. Generally there is some adhesion which can be severed either with a sharp scalpel or with scissors that cut well on the ends. In cutting these adhesions in this manner you diminish the area of raw surfaces and are less likely to tear into the bowel, necessitating drainage and rendering attempts at conservatism almost futile. If this condition does not happen but we have nevertheless created extensive raw surfaces, adhesions will recur, diminishing our chances of conservatism, and often forcing us to reenter the abdomen and perform a total extirpation. The adherent bowels having been carefully separated, we now study the position and condition of the adnexa. If pus is suspected we gently pack them off with dry or moist sponges. A way I have found easy and associated with the least amount of traumatism is to hold up the upper angle of the wound well with the right hand while the bowels are pushed up with sponges.

When the hand is removed the walls of the abdomen drop on the sponges fixing them, as it were, and keeping the bowels out of the field. This way will also require less sponges. Use no sponges if possible in a clean case unless the bowels are constantly obstructing the field of operation. The adnexa very often are found firmly adherent to the under surface of the broad ligaments. They may be free from inflammation, and the ends of the tubes closed; the cavity either dry or containing fluid. These are the best cases for conservatism. To dissect away these structures with as little traumatism as possible, a sponge on a sponge holder is used with a sweeping motion from behind forward keeping close to the broad ligament. The finger may be used to steady the structures while the sponge dissects, using sharp scissors or a knife whenever possible to cut firms bands and avoid injuring or disturbing the blood supply. When the adnexa are separated by this means they will be found in a fair state of preservation from external trauma, and the broad ligaments will not be opened causing troublesome oozing or active bleeding.

After both sides are freed from beds of adhesion, we decide whether one or both can be saved. No crushing instruments should be used on the structures that are to remain. The round ligament may be caught with a sponge holder to steady or bring up the ovary and tube while dissecting. The ovaries and tubes, now freed, are held up with the finger, or in the above mentioned way, on a level with the incision. Unless all adhesions are removed it will be impossible to bring the structures to this level; they remain low, making it very difficult to work upon them. The adnexa being in plain view we next study what is best to be done. If both ovaries are cystic and there is a history of constant pain on one side only, we should attempt to employ our conservatism on the side free of pain, even if the ovary on that side is not as good as the other, for the patient may still continue to suffer after the operation, no matter what is done. If we find that both ovaries are nearly normal and the pain was probably due to adhesions, we should observe all conservatism possible on both sides.

After the ovary and tube are freed we often find thin membranes from adhesions, spread over them, making them appear badly diseased. When these membranes are carefully dissected away what appeared at first to be a very bad ovary or tube will be found in a fair state, and it is important to always remove these membranes before dissecting the structures, so as to secure a better idea of how much to save. The ovary freed of all adherent bands and membranes, we study it to see how much can be saved. If only one cyst exist this can be removed without rupture by sharp dissection. The ovary held between the fingers, an incision is made around the base of the cyst, and with the blade of the knife this is easily pushed away, as it were, from the ovary. The line of incision is then closed with great care so as to allow no raw surfaces for adhesions. If the ovary is studded with cysts, as we often find it, the above step can be done for the largest cyst, and the smaller ones punctured, or the cyst area may be removed by sharp dissection, being careful to keep close to the hilum where the greater part of healthy tissue is found, and the circulation most active. An important point is to be sure that the circulation of the ovary is not interfered with either in suturing or by position, lest cysts may recur. We find this strongly demonstrated in the majority of simple retrodisplacements in young subjects. The ovaries are free from adhesions but often we find cystic conditions. This most probably is due to a kinking of the broad ligaments interfering with the return circulation and keeping up a passive hyperemia.

The ovary resected we decide what is best to do for the tube. If we find the fimbriated extremity in a fairly good state after separating adhesions and removing any foreign membrane, and the lumen patulous, we allow the tube to remain. If the outer extremity is closed and contains serum we attempt conservatism on the side that is free of pain, of course both sides being in about the same condition. The diseased portion is clamped and removed. When only the outer third is removed the lumen is large enough to suture the mucous membrane and peritoneum, together, without difficulty.

When the outer two thirds is removed the lumen is small and requires more tedious suturing.

A cambric needle held with artery forceps is inserted into the tube, while with a fine sharp pointed scissors or a cataract knife, the canal is laid open for about a half an inch. The mucous membrane is then carefully sutured to the peritoneum especially around the new lumen. When this is completed the flaps are either sutured to the under surface, everting them, or the free end of the flap may be turned under so as to keep the new opening patulous.

If the uterus is inclined to drop backward we should suspend it either temporarily by including the fundus in one or two of our peritoneal sutures, or perform one of the typical operations now used for retrodisplacements. This point I consider important for after manipulating, the ligaments are often stretched, and if the uterus is allowed to remain free and dropping backward, even if only for a few hours, adhesions may form and spoil our efforts at conservatism. To further insure against adhesions occurring, the foot of the bed is elevated 18 to 24 inches so as to throw the bowels away from the field of operation. This position is maintained for seventy-two hours.

Illustrative Case.

Mrs. E., referred by Dr. M. L. Duggan, aged 30 years. Previous personal and family histories good. Menstruation regular, 28 day type, duration three days, amount normal, very little pain either before or during epoch.

In September, 1911, she was taken with severe pains in left side. Examination by Dr. Duggan showed a mass about the size of a lime, very painful on pressure, temperature ranged between 100 and 102° for one week. After ten days of rest in bed, with ice bag to the side, hot iodine douches, and free purgation, the temperature and severe pain subsided, and the mass became smaller and less sensitive to pressure. The patient was allowed to get up, and advised to continue douching. The pain in the left side never entirely left her after this attack. In May, 1912, she menstruated almost continuously for three weeks. Towards the end of the three weeks she began to suffer from severe pains in the right side; temperature 102° at time of examination; this being the first time she felt any pain in the right side. There was then a mass about the size of an orange on the right side, very painful, and a mass about the size of a lime on the left side, less painful than that on the right side. She was put to bed, with an ice bag to the lower abdomen, iodine douches three times daily, and frequent purgation. She remained in bed for two months. At the end of this time, the masses were still present but somewhat smaller, her temperature was normal for three weeks and she felt pain only on pressure.

Operation: July 21, 1912. Dilatation and Curettage. Then a median abdominal incision of sufficient length to thoroughly explore field. Several coils of small bowels were adherent to both adnexa and the uterus. These were carefully separated and the bowels gently packed off with sponges.

The right ovary and tube were intimately fused into one mass. They were removed, and when laid open were found to consist of a hard clot which proved to be an extra-uterine pregnancy. The left adnexa were firmly adherent to the under surface of the broad ligament and surrounding structures. They were carefully separated and showed the fimbriated extremity closed and containing several ounces of serum. The ovary was six or eight times the normal size, studded with cysts almost in its entirety. The outer two thirds of the tube was removed, a cambric needle, held with artery forceps, was threaded into the lumen, and the canal laid open with a fine cataract knife for about half an inch. The mucous membrane was carefully sutured to the peritoneal coat, especially around the new opening. The two sides of the flap were sutured to the under surface of the tube with the purpose of keeping the surfaces apart and the lumen patulous. About a quarter of the ovary, the part nearest the hilum was saved. Even this small piece contained several small cysts which were punctured.

After the operation the foot of the bed was elevated 20 inches for 72 hours.

Post-Operative History: The patient suffered very little inconvenience from the position. She expelled flatus twenty-four hours after operation without the aid of the rectal tube. An ice-bag was kept constantly on her left side with the hope of keeping down any secondary inflammation that would cause adhesions and thwart the effort at conservatism. She left the hospital in twelve days feeling perfectly well and having no pain whatever on her left side. She has continued to feel well, gaining several pounds in weight.

Menstrual History After Operation: Her menses are regular, twenty-eight day type, lasting three days, as much in quantity as before the operation, and not associated with any pain or discomfort. She has had no nervous symptoms after the operation.

In April, 1913, nine months after her operation, she became pregnant. This pregnancy was associated with very little trouble, having only the usual symptoms of slight nausea and vomiting. She was delivered of a nine pound boy in January, 1914. She is now expecting to be delivered of her second baby some time this month.

This case without doubt shows that our aim should always be towards conservatism, especially in young women who are anxious to have children, no matter how little we allow to remain. Here I saved only one-third of a tube and one quarter of an ovary, yet this conservatism has been followed by pregnancies. The woman was very anxious to have children and her only hope was to save all we could, no matter how little.

If we are to attempt conservatism all of our manipulations should be carried out with the greatest amount of care so as to inflict the least amount of traumatism and not have our efforts spoiled by adhesions occluding our new opening and causing continued pain necessitating another operation and rendering conservatism hopeless.

Cancer of the Cervix Uteri.

There are certain borderline cases which may apparently sometimes be cured. If the disease extends anteriorly the bladder wall soon becomes involved and often relatively early in the course of the disease. While the lateral and posterior extension of cancer are difficult to handle, and also very difficult to cure, because the extension in this direction is in the course of the main lymph channels, the anterior extension of the disease remains local for a longer time and is much more favorable for a cure, and technically is much easier to remove. Occasionally patients with metastases to the accessible pelvic lymph nodes may be cured.—John A. Sampson in the *N. Y. State Journal of Medicine.*

AN OPERATION FOR RETRODISPLACEMENT OF THE UTERUS.

A. S. A. W. Collins, M.D.,
San Francisco, Cal.

Since 1905 I have frequently operated upon posterior displaced uteri by the following method, and the results have been so good compared with other operations, that I feel justified in offering it as a safe and practical procedure.

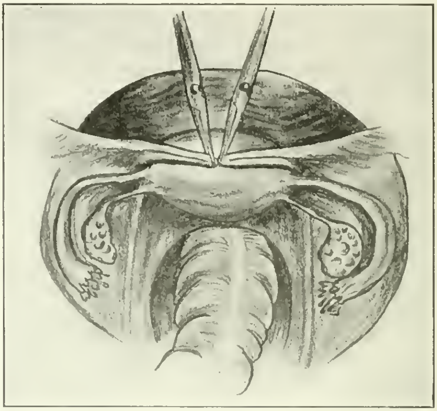


Fig. 1.

The uterus is held in normal position, the round ligaments are caught with Kelly forceps and brought toward the median line. (Fig. 1.)

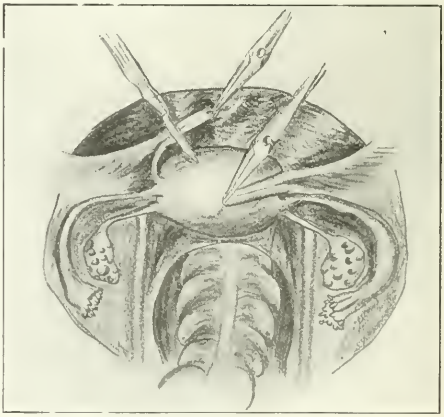


Fig. 2.

About 1 inch of the peritoneum is peeled back from close to the tip of the forceps. (Fig. 2.)

As the object of the operation is to maintain the uterus sufficiently anterior so that intra-abdominal pressure is exerted upon the posterior surface of the fundus, and also to overcome a prolapse of the ovaries, I decide now between one of two methods.

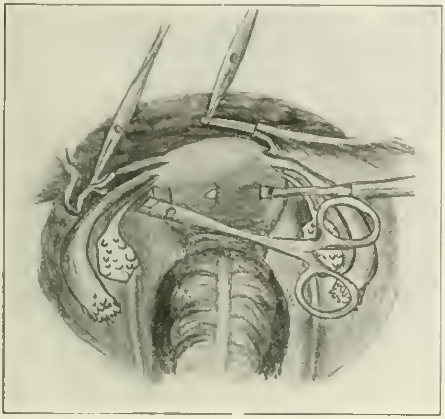


Fig. 3.

Either bring the ligament under the round and ovarian ligaments through an opening in the broad ligament posteriorly, as in Webster's operation (Fig. 5) or anteriorly (Fig. 6).

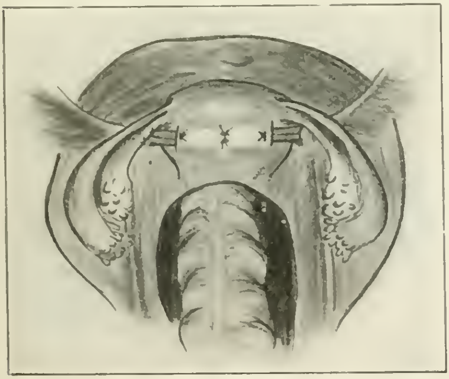


Fig. 5.

A stab with a knife is made under the peritoneum and about a sixteenth of an inch into the muscle of the uterus and brought out again (Fig. 3). The knife should be narrow and the wound made just large enough to accommodate the round ligament. The same is done on the opposite side and the ligaments are then sutured in place. (Figs. 5 and 6.)

The operation is rapidly done. There are no raw surfaces and no bleeding.

1. It is a muscle to muscle attachment, and no possibility of a pulling away to one side or another.

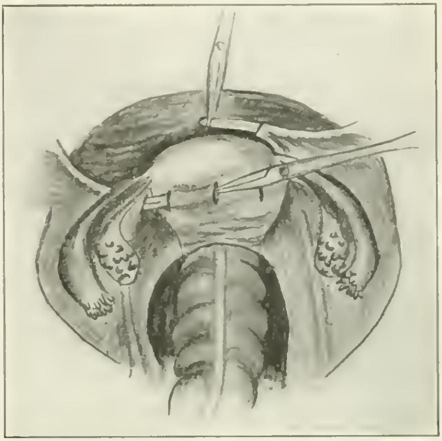


Fig. 4.

2. It is not a peritoneal attachment which forms an adhesion and will stretch or give away altogether.

3. There is no interference in pregnancy. I have four patients that have gone through labor normally with the uterus in good position afterwards.

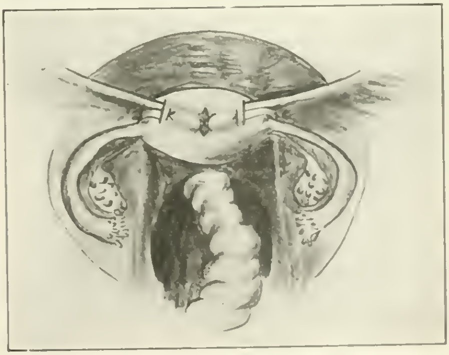


Fig. 6.

4. No bladder or other subjective symptoms follow.

5. The uterus remains mobile.

No. 126 Post St.

A NEW AND CONVENIENT INSTRUMENT STERILIZER.

J. MacDonald, Jr., M.D.,
East Orange, N. J.

When I first joined the Urological Staff of the House of Relief, New York Hospital, O P. D., some seven years ago, I immediately recognized the inadequacy of the method of sterilization of instruments, especially of Sounds, Catheters, Hypodermatic Syringes, Dilators, etc.

In using boiling water as a sterilizing medium, most frequently a Sound or Dilator would slip from the instrument forcep, drop back in the water, resulting in a scalded hand of the operator.

After suffering the inconvenience of the only form of sterilizer then upon the market suitable for such work, I designed a roughly constructed model from two cigar boxes and had made from this a sterilizer, the object of which was to raise the sterilized instruments from the boiling water, permitting a better selection of those wanted and at the same time protect the operator from being scalded.

The sterilizer made from my model worked very satisfactorily. It was nothing more than an oblong copper container with an inside perforated instrument tray. Hinged to the upper third of the posterior angle was a rod passing around the sides and in front of the container. To the center of the rod on each side were chains running over the top of the container, upon pulleys, and attached to the perforated tray.

By pressing down upon the rod, the tray was raised from the boiling solution. Occasionally some difficulty was experienced in raising the tray, particularly so if the instrument container was not fairly well balanced.

Realizing the advantage of a sterilizer, especially for office purposes, where boiling water was used as a sterilizing medium, or some of the milky solutions such as Lysol, where the instruments are more or less obscured, particularly small eye instruments and needles of various kinds, I described to a *manufacturer of sterilizers the details of my roughly designed affair, and recommended that they work out a sterilizer that would not only raise the instruments from the sterilizing solution but the lid of the sterilizer as well, which is of particular advantage, especially where boiling water is used.

In my original design, which, by the way, has been in constant service for the past seven years, compartments were devised within the sterilizing tray for holding the various size sounds. This works very satisfactorily in private practice, but where 100 or 150 patients are treated in three hours by a busy staff, the replacement of sounds in the compartments arranged for them in quite impossible.

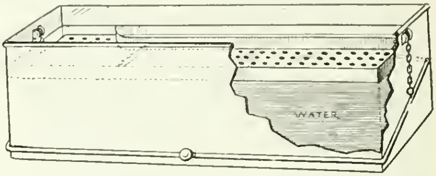
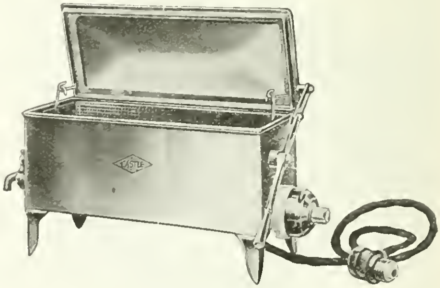


Fig. 1. Sterilizer from Original Model.

The sterilizer here illustrated seems to be mechanically perfect and does the work required of it. With one operation the lid of the sterilizer and tray are raised, bringing the instruments into view and out of the sterilizing solution. After selecting the instrument required the tray can be again lowered into or retained out of the solution, as desired.



Perfected Sterilizer

I know that hospital sterilizers have been devised with a foot lever for raising the lid and possibly the contents of the sterilizer, but on account of their size and expense they are not adaptable for office purposes such as the one here described and illustrated.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, MARCH, 1916.

THE TEACHING VALUE OF THE MOVING PICTURE AND THE PHONOGRAPH IN SURGERY: A PROPHECY IN FULFILMENT.

In the history of most human affairs a decade is no great period of time; but measured in terms of medical progress or, more especially, by the enormous strides of those young but giant industries, the automobile and the moving-picture, ten years is a long time, indeed! In THE JOURNAL, May, 1906, we spoke editorially of the possibilities of "The Stereoscope, the Vitascope and the Phonograph in Medical Teaching." The stereoscope had already come into service as an aid in illustrating medical articles, surgical works and anatomical dissections, and its value in roentgenography was promptly recognized and developed. (Quarterly Atlas of Stereoroentgenology has very recently been established); but the employment of the "movie" and the phonograph in surgical teaching is only now, after more than ten years, being seriously undertaken.

The few so-called demonstrations of surgical operations by means of the vitascope, as the moving picture was called in 1906, that were made before or since then, were, as far as we know, chiefly dramatic in quality and little, if at all, technically instructive. They showed only what might be seen from a distant seat in the amphitheater—the operator's face, the assistants' backs and now and then a tantalizing glimpse of the operative field.

To be of value, a "movie" reproduction of an operation should show no more of the surgeon and his assistants than their hands and it should provide a *close, uninterrupted* view of the operation itself *in all its technical minutiae*.

The task to secure such pictures, by no means an easy one, has now been accomplished by the coöperation with "The Clinical Film Company" of some enthusiastic New York surgeons—among whom Dr. J. Bentley Squier especially deserves commendation for the experimentation that solved the problems of lens, distance, lighting, etc.

The striking feature of these pictures is that, enlarged as the field is upon the screen, they show all that, if not more than, can possibly be seen by standing at the very edge of the operating table itself, and vastly more than visitors can usually see in even well-arranged operating theaters. They present a continuous view of the operation itself uninterrupted by the movements of the surgeon's body or his assistants'. Every step of the procedure, every detail in technique are clearly, continuously portrayed.

Of secondary but of very great importance is the employment of a—for this purpose at any rate—very satisfactory synchronizing device, by means of which the surgeon's remarks will be reproduced phonographically with the pictures.

It needs no stretch of imagination to see the value of such accurate reproductions for undergraduate and post-graduate schools and for medical gatherings. Without traveling a thousand or more miles the surgeon or the student in Colorado will be able to see and hear, in accurate detail, a cranial operation by Cushing, a laminectomy by Elsberg, a gastrectomy by Mayo, a bone graft by Albee, a suprapubic prostatectomy by Fuller, a perineal prostatectomy by Young—and later on, let us hope, a nephrectomy by Israels, a thyroidectomy by Kocher, a bone-plating by Lane. Future generations of physicians will equally be able to see the work of these surgical masters when they are no longer in the flesh.

The educational values of the moving picture are still undeveloped. Perhaps in no other field than in medicine are there greater teaching possibilities for the wizard Edison's inventions, the vitascope and the phonograph.—W. M. B.

LUNG ABSCESSES FOLLOWING TONSILLECTOMY: THEIR PRACTICAL LESSONS.

A very serious and hitherto little considered sequel of tonsillectomy was emphasized and beautifully illustrated by Wessler, who reported in the *Interstate Medical Journal*, January, 1916, his roentgenographic observations of eight cases of lung suppuration following tonsillectomy under general anesthesia. We invite the serious attention of our readers to the article in this issue of The Journal in which Manges discusses from the clinical side those eight cases, and a ninth, all of them studied roentgenographically and some of them bronchoscopically and surgically.

That nine such cases should have come to one hospital within a year would clearly indicate that lung abscess and other serious pulmonary lesions are not rare after tonsil, adenoid, and similar throat operations. We endorse Manges' conclusions that tonsillectomy should not be lightly undertaken as a minor operation, that it should be preceded by a careful physical examination, and that it should be followed by a reasonable period of nursing in bed; and especially we endorse his recommendation of the employment in operations upon the tonsils and adenoids of a suction tip to keep the fauces clear of blood and shreds of tissue, aspiration of which is, more probably than embolism, the cause of these pulmonary infections.

Even when the operation is performed under local anesthesia a suction apparatus is a most desirable adjunct; certainly it effects a more elegant and more satisfactory cleansing of the field than does sponging. When the patient is deprived of his reflexes by general anesthesia, then, as these cases show, the use of the suction is well nigh imperative. Some anesthetists have provided themselves with an electrically-driven suction device for the purpose; and we believe that all of them who assist in operations of this character should do so. An admirable electric suction apparatus, equipped with a variety of tips for general surgical work, has been devised by Dr. C. Edmund Kells, of New Orleans. Yankauer's, much smaller and easily portable, is also quite powerful and well adapted to throat operations, bronchoscopy, etc. Lacking such a mechanism, however, one may rig up a satisfactory water suction device on the principle of the Sprengel pump, as employed by Kenyon and Poole. —W. M. B.

Surgical Suggestions

A constrictor applied to the arm too tight or for more than a short time may cause paralysis of one or more of the brachial nerves.

Pain at the lower end of the spine on lying or sitting is much more apt to be due to an infected coccygeal dermoid (pilo-nidal) cyst than to a "coccygodynia," for which, however, it is often mistakenly treated. A minute midline opening in the skin, which may discharge a little fluid and sometimes a few hairs, establishes the diagnosis.

Letter to the Editor

Henry L. Elsner, M.D.,

Army Medical Museum and Library,
Washington, D. C., Feb. 19, 1916.

Editor, American Journal of Surgery,

Dr. Henry L. Elsner, professor of medicine at Syracuse University, who has just died, was one of the best known clinical teachers in this country and the most prominent physician in northern New York. He was a man of extremely refined, genial and loveable disposition, charitable to a fault and denying himself to no patient, however humble, at whatever hour.

His exertions in this regard eventually told upon his health, as did the arduous labors upon his massive treatise on Medical Prognosis, shortly to appear.

This work, richly stored with the fruits of his wide clinical experience and his unusual knowledge of the texts will be a monument to his memory.

Fielding H. Garrison, M.D.,
(Editor, *Index Medicus*).

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

SURGERY OF THE PRESENT WAR.

Authoritative reports on the surgical aspects of the European War are not numerous. When the history of these surgical experiences is written there will be many phases of military surgery requiring modernization of national preparation to be able to cope with the newer conditions arising from modern warfare.

The large number of men involved in offensive and defensive fighting, the character and force of modern projectiles and the hazards of trench warfare, have brought new problems to military surgeons. No longer is the medical corps beyond the zone of actual battle and along the line of possible retreat; but today hospitals of all kinds are well within the firing zone. The devastations by high velocity bullets, shrapnel, bayonets, hand grenades, rapid fire guns, asphyxiating gases and burning liquids have developed types of injury calling forth much ingenuity, skill and perseverance in order to restore the soldiers to either military or civil service.

For those particularly interested in these aspects of surgical service the Report on the Medico-Military Aspects of the European War From Observations Taken Behind the Allied Armies in France by Surgeon A. M. Fauntleroy, U. S. Navy, will prove of unusual value. It is published under the direction of the Bureau of Medicine and Surgery of the Navy Department. Particularly rich in illustration, it presents the horrors of civilized warfare most strikingly.

In the discussion of military organization and equipment, it is essentially descriptive. The section dealing with the organization for the transportation and care of the sick and wounded is particularly rich in information such as has not found expression in magazines or books dealing with the problems of the war.

The section devoted to gas-bacillus infection is most illumining and insofar as no previous war has given rise to such extensive infections of this type the surgical questions involved are of unusual interest and importance.

Considering the difficulties in acquiring the real lessons of the war Dr. Fauntleroy has performed his work with great care and discrimination and the mass of information which he has collected should prove of unusual value to both the military and naval branches of the service, particularly those surgeons whose names are on the roster of the Medical Reserve Corps.

Is Typhoid an Accident?

The interpretation of workmen's compensation acts is of general importance at the present time while their provisions are under consideration by legislators throughout the country. The Wisconsin Supreme Court (*Public Health Reports,* February 11, 1916) recently decided that the death of an employee caused by typhoid fever contracted as a result of drinking impure water furnished by the employer was an accident and the employer was held liable under the Wisconsin Workmen's Compensation Law.

Peculiarly among the facts cited is the discharge of the sewage of the employing establishment into the river. The employer utilized water from this river by means of intake pipes so located that they carried water contaminated by sewage. This contaminated water supply owing to defective piping became mixed with the pure water of the city water works. The employee by drinking this polluted water fell ill with typhoid fever and as a result died.

The Court held that the mere affliction with typhoid fever while in the defendant's service could not be deemed accidental injury. The typhoid fever, however, being attributable to the unexpected occurrence of bacteria in the drinking water furnished by the employer as an incident to employment constitutes an unexpected and unintended mishap growing out of his employment and thus the infection occurred while "he was performing services growing out of and incidental to his employment." Diseases thus contracted are injuries within the construction of the workmen's compensation act.

Obviously, this interpretation is fully in accord with the theory of the English Compensation Act which made employers liable to employees for "personal injury by accident arising out of and in the course of employment." Under this Act it has been construed that disease may be accidental in origin, as for example, an infection by anthrax and even pneumonia. This interpretation of the law does not at first sight appear to give the common significance to "personal injury." In general, it refers to conditions resultant from the application of external violence. Sickness and accident do not arouse identical concepts in the thinking mind. It is, however, quite possible to conceive of a disease being accidental in origin. The provision of compensation for sickness was not initially contemplated by the formulators of workmen's compensation acts. Many important questions arise as to the origin of various diseases and it is exceedingly difficult to offer supporting proof as to their exact origin.

The legal phase of the problem may be more or less readily established but certainly the courts cannot go more rapidly than the facts of medicine warrant. The concurrence of disease during any particular occupation is hardly *prima facie* evidence that there is any causal relation existing between them. If the man in question had not died from typhoid fever but later had been afflicted with gall stones following that disease would the operation for gall stones have been deemed essentially an accident or personal injury within the interpretation of the workmen's compensation act? Could he have recovered possibly on the grounds that the gall stones resulted from the typhoid fever contracted while "performing service growing out of and incidental to his employment"?

Book Reviews

Urgent Surgery. By Félix Lejars, Professeur Agrégé à la Faculté de Médecine de Paris; Chirurgien de l'Hôpital St. Antoine. *Translated from the Seventh French Edition* by William S. Dickie, F.R.C.S., Surgeon, North Riding Hospital, Middlesborough, and Ernest Ward, M.A., M.D., F.R.C.S. *Third English Impression. Volume II*—The Genito-Urinary Organs—The Rectum and Anus—The Strangulated Hernias—The Extremities. Large octavo; 588 pages; 20 full-page plates and 1,086 illustrations. New York: William Wood & Co., 1915. Price, $7.00, net, per volume.

A review of the first volume of the translation of the 7th French edition of Léjars' classic appeared in the Journal, December, 1914.

As compared with the preceding English edition, volume 2 shows no new topics, but a general revision with slight enlargement and several new illustrations.

We need add nothing to our praise of this masterpiece in reviews of earlier editions. It is a treatise replete with practical hints and wise advice and should be read by all surgeons. Especially to those men, not experienced surgeons, who practice in communities where they must meet the demands of emergencies, this work is an invaluable aid.

Mr. Dickie's translation of volume 2 was interrupted by his call to the front and it was continued, therefore, by Dr. Ernest Ward.

Painless Childbirth, Eutocia and Nitrous Oxid-Oxygen Analgesia. By Carl Henry Davis, A.B., M.D., Associate in Gynecology and Obstetrics, University of Chicago; Assistant Gynecologist and Obstetrician, Presbyterian Hospital, Chicago. Duodecimo; 134 pages. Chicago: Forbes & Co., 1916. Price, $1.00.

This little book by Davis is particularly welcome at this time, with its definite message of reassurance to the profession and to the public that painless childbirth is possible and safe moreover, and that in gas-oxygen analgesia we have a method to insure eutocia, the dream of the expectant mother as against amnesia, the much-vaunted promise of "twilight sleep." For while labor is a physiologic process and originally was not associated with agonizing pain, this is exceptionally absent in the experience of civilized woman. Amnesia on the other hand is a fairly constant immediate sequel of labor and is achieved spontaneously by nature even without the intervention of the drugs to cloud the memory. What nitrous oxid-oxygen analgesia does is to lessen and even to remove the sensation of pain, thus obviating the necessity of the amnesia, which is at best but a poor solace. The method as practiced by Davis and others in this country is so rational and safe as to receive the general endorsement of the medical profession, an endorsement which it has withheld, the lay press notwithstanding, from the undesirable and unsafe "twilight sleep." We are glad to note throughout the pages of this book an ardent plea for clean and safe obstetrics, no matter what particular method of analgesia in labor one may choose to employ.

The American Atlas of Stereoroentgenology. A quarterly. Edited and published under the sole auspices of the New York Roentgen Society. Editors: Leopold Jaches, M.D., Wm. H. Stewart, M.D., H. M. Imboden, M.D. Troy, N. Y.: The Southworth Company.

The first number of this quarterly atlas, recently issued, gives promise that it will find a welcome place in the current literature of roentgenology. It is issued under the auspices of an important and progressive Roentgen society, and its publisher has had ample experience in this special field provided by the successful conduct of "The Stereo Clinic."

To the various atlases of roentgenograms in bound volumes, such as Grashey's, this atlas of stereoroentgenograms will add an amount of important information that single pictures cannot provide; while its appearance at quarterly intervals will make it possible to have that information up-to-date.

The work is handsomely printed, as a loose leaf journal, on stiff paper. The pictures are small enough for the familiar and inexpensive hand stereoscope.

Radium, X-Rays and the Living Cell with Physical Introduction. By Hector A. Colwell, M.B. (Lond.), D.P.H. (Oxford), Late Assistant in the Cancer Research Laboratories, Middlesex Hospital; and Sidney Russ, D.Sc. (Lond.), Physicist to the Middlesex Hospital. Octavo; 324 pages; 51 illustrations. London: G. Bell and Sons, 1915.

In view of the great importance attaching to the *x*-ray as a therapeutic agent in malignant growths, it is especially gratifying to have at our disposal practically, for the first time, in this work of Colwell and Russ a book which deals in the most comprehensive way with the manner in which the radio-active substances influence the living cell. For the student who may be attracted toward investigation in this line, the authors have supplied the outlines of the physical properties of the radiations so that he does not need to wander amongst numerous reference books. The effects upon the living vegetable and animal cell of the alpha, beta, gamma and *x*-rays are amply illustrated by experiments on a great many specific tissues, plants and organs. An attempt has been made by the authors, and it may be said with gratifying result, to correlate all the facts in this difficult problem and to lay down the foundations of a rational basis of radiotherapy.

A Guide to Gynecology in General Practice. By Comyns Berkeley, M.A., M.D., M.C. (Cantab.), F.R.C.P. (Lond.); and Victor Bonney, M.S., M.D., B.Sc (Lond.), F.R.C.S. (Eng.), M.R.C.P. (Lond.). Octavo; 452 pages; 144 illustrations. London: Henry Frowde, Oxford University Press, 1915. $6.50.

In spite of the numerous books on gynecology there seems to be more than ordinary justification for the book by Berkeley and Bonney. It represents quite a departure from the customary gynecological text-book in the manner of arrangement of the subject-matter, in the abundant detail of diagnosis and physical examination, and in the practical feature of numerous cross-references. It is not merely a text-book nor a series of lectures, it is an instructor having an eye always on the weakness of his pupil, and by continuous "pounding away" helping to fasten in his mind the salient points and correlating them so that when the course is over, the book finished, he has a good working idea of how to conduct the management of the gynecologic patient. The authors have succeeded in carrying out this method of instruction even to Part V on the medico-legal aspects of gynecology, a portion of vital importance to the practitioner and hitherto only too sadly neglected.

Laboratory Methods: With Special Reference to the Needs of the General Practitioner. By B. G. R. Williams, M.D., Member of Illinois State Medical Society, American Medical Association, etc., and E. G. C. Williams, M.D., formerly Pathologist of Northern Michigan Hospital for the Insane, Traverse City, Mich.; with an Introduction by Victor C. Vaughan, M.D., LL.D., Professor of Hygiene and Physiological Chemistry and Dean of the Department of Medicine and Surgery, University of Michigan, Ann Arbor, Mich. *Third Edition.* Small octavo; 214 pages; 43 engravings. St. Louis: C. V. Mosby Company, 1915. Price, $2.50.

This well-arranged volume successfully presents to the general practitioner the reliable and indispensable laboratory methods, both old and new. The authors have stressed the safe procedures for diagnosis, and on the other hand, have made clear what texts have a limited value and which texts may be particular sources of error In the best sense of the word, this small volume is really a manual, by whose pages the conscientious doctor may carefully carry out the directions of nearly all laboratory tests called for in his general practice. The directions for laboratory equipment are brief and sensible The urine, the blood and stool, as well as the other bodily secretions and excretions, the methods for blood diagnosis, the growing and differentiation of the more usual types of bacteria, the practical essense of tissue diagnosis, even a technic for private post-mortem examinations, as well as many other practical items too numerous to detail here, are adequately presented. The illustrating engravings add clarity and interest to the text

The Description of an Ophthalmoscope, being an English translation of Von Helmholtz' *"Bechreibung eines Augenspiegels"* (Berlin, 1851). By Thomas Hall Shastid, A.B., A.M., M.D., LL.B., F.A.C.S., Superior, Wisconsin. Chicago: Cleveland Press, 1916.

This, the first translation into any language of Helmholtz' classic describing his great invention, the ophthalmoscope, is a labor of love, dedicated, appropriately, to Dr. Casey A. Wood. The edition is limited to 500 copies.

Books Received

The Roentgen Diagnosis of Surgical Lesions of the Gastro-Intestinal Tract. By Arial W. George, M.D., Assistant Professor of the Department of Roentgenology, Tufts College Medical School; Consulting Roentgenologist to the Carney Hospital; Boston Dispensary and the Forsyth Dental Infirmary; Fellow of the Massachusetts Medical Society; Member of the American Roentgen Ray Society; and Ralph D. Leonard, A.B., M.D., Assistant in the Roentgen Department of the Boston City Hospital; Instructor in Roentgenology at Tufts College Medical School; Fellow of the Massachusetts Medical Society. Three hundred and six pages, including seven three-color illustrations, eighteen artist's drawings, and three hundred and forty-three Roentgen plate reproductions. The Colonial Medical Press, 1915, Boston. All rights reserved Price, cloth, $10.00 net.

Nouveau Traité de Chirurgie XXXII. Maladies des Organes Genitaux de L'Homme. Par Pierre Sebileau, Professeur Agrégé, Chirurgien de l'hôpital Lariboisière. et Pierre Descomps, Professeur Agrégé, Chirurgien des Hôpitaux de Paris. Paper bound; octavo; 684 pages; 114 illustrations. Paris: J. B. Baillière et Fils, 1916. 16 francs.

Cancer of the Stomach. A Clinical Study of 921 Operatively and Pathologically Demonstrated Cases. By Frank Smithies, M.D., Gastro-enterologist to Augustana Hospital, Chicago. With a chapter on the Surgical Treatment of Gastric Cancer, by Albert J Ochsner, M.D., Professor of Clinical Surgery in the University of Illinois. Octavo; 522 pages; 106 illustrations. Philadelphia and London: W. B. Saunders Company, 1916. Cloth, $5.50, net; half morocco, $7.00, net.

A Practical Treatise on Infant Feeding and Allied Topics. For Physicians and Students. By Harry Lowenburg, A.M., M.D., Assistant Professor of Pediatrics, Medico-Chirurgical College, Pediatrist to the Mount Sinai Hospital, Philadelphia, etc., etc. Octavo; 382 pages; 64 engravings, and 30 original full plates. Philadelphia: F. A. Davis Company London: Stanley Philips, 1916. Price, $3.00, net.

Cloacal Morphology in its Relation to Genito-Urinary and Rectal Diseases. By Benjamin Merrill Ricketts, Ph.B., M.D., LL.D., F.A.C.S., Founder and Director of the B Merrill Ricketts Experimental Surgical Research Laboratory, Cincinnati, etc., etc Paper bound; octavo; 133 pages; 54 plates; 93 illustrations Copyright, Benjamin Merrill Ricketts, Cincinnati

The Starvation Treatment of Diabetes. *With a Series of Graduated Diets* used at the Massachusetts General Hospital. By Lewis W Hill M.D.,Children's Hospital, Boston, and Rena S. Eckman, Dietitian, Massachusetts General Hospital, Boston. With an introduction by Richard C Cabot, M.D. *Second Edition* Duodecimo; 131 pages. Boston: W. M Leonard, 1916

Beauty a Duty. The Art of Keeping Young. By Susanna Cocroft, author of "What to Eat and When," etc., etc. Octavo; 384 pages; illustrated. Chicago and New York: Rand, McNally & Company, 1916. Price, $2.00, net

Year-Book of the Pilcher Hospital (Brooklyn), for the period from April 1, 1913-Dec. 31, 1914 (4th and 5th years of the hospital.) By the Hospital Staff

Anatomy of the Brain and Spinal Cord, With Especial Reference to Mechanism and Function. By Harris E Santee, A.M., M.D., Ph.D., Professor of Nervous Anatomy in Chicago College of Medicine and Surgery, etc. *Fifth Edition.* Octavo; 474 pages; 158 illustrations, 46 in colors. Philadelphia: P Blakiston's Son & Co., 1915. $4.00.

Progress in Surgery

A Résumé of Recent Literature.

A Contribution to the Subject of Skull Fractures: Analysis of 1,000 Cases at the Cook County Hospital, and a Report of 74 Cases Examined at Autopsy.

F. A. Besley, Chicago. *Journal American Medical Association* January 29, 1916.

Besley gives an analysis of 1,000 cases of skull fractures and a report of seventy-four cases examined at necropsy. Skull fractures are frequent injuries, and he has had large opportunity of studying their mechanism which has led him to advance a new theory as to the manner in which the applied force produces them. The present and accepted theories regarding the mechanism are based on and embody two definite principles: one, the inbending of the skull at the point of the blow; two, the bursting of the skull at a point some distance from the applied force. The bursting theory has largely to do with the fractures of the base of the skull, and is founded on the underlying physical law that when a hollow sphere is compressed the tendency is for it to fracture in a meridian parallel to the applied forces. This occurs when the skull is experimentally compressed between two fixed points, as in a vise Besley takes issue with the application of this theory in actual practice If the skull were a perfect hollow sphere with equally thick walls everywhere and the articulation with the condyles be taken as one of the fixed points it would be more acceptable, but this is not the case. In seventy-four cases observed at necropsy the middle fossa was involved fifty-four times Experimenters have not given sufficient weight to the fact that the base of the skull has a fixed point at the atlas, and when a blow is received at any point on the vault, there is a counter inbending force at the articulation with the condyles. A careful study of the seventy-four cases has convinced him that fractures of the base are not produced by bursting force, but are due to a direct inbending force applied at the articulation He has repeatedly observed that the fractures occupy the same position and are of about the same extent, regardless of the location of the injury on the vault The thinness of the skull through the middle fossa accounts for the frequent fracture at these sites. In all the examinations Besley has made he has not observed a fracture of the posterior or occipital fossa that was not a direct continuation of a fracture of the vault. The bursting force may be a factor when the skull is caught between two fixed points, but he feels sure that it is not a fracture in the large majority of the cases. A fracture of the inbending type produces more extensive separation of the inner table, which can be illustrated by the break on the convex surface of a green stick A high-powered bullet at close range may cause such an expansion of brain tissues as to burst the skull. In bullet wounds it is possible to distinguish the wound of exit by the greater amount of radiating fracture, and this may be of importance in medicolegal cases. In compound fractures of the base little can be done against infection. It may be more effectively combated in fractures of the vault. The history is naturally of importance in the diagnosis. In the 1,000 cases analyzed, 384 patients received their injury by a fall from a height, and 311 were struck on the head. With scalp intact it is almost impossible to certainly diagnose fracture, and the cracked spot percussion sound was found unreliable. The roentgenogram was found the surest aid, especially with the stereoscopic plates. The general signs of intracranial pressure are usually present, the focal signs are dependent on the locality of the brain injury and compression or focal signs are strongly indicative, though not always certain signs of fracture. If there is a free interval of consciousness after the first unconscious condition followed by a deeper unconsciousness there is probably a progressive hemorrhage. Occasionally an involvement of one of the cranial nerves, most often the sixth, is the only sign that is present. Besley does not advise spinal puncture if a sufficiently certain diagnosis can be made without it, though blood in the spinal fluid would be strongly presumptive of fracture. He gives tables of pulse rates and pupillary changes from the thousand cases, showing that the average pulse rate is higher in fatal cases and in relatively few was it slow. The respiration average was also higher though there was no very striking change from usual

Report of a Case of Deposit in the Supraspinatus Muscle Simulating Subacromial Bursitis. By John Dunlap, Washington, D. C. *American Journal of Orthopedic Surgery*, February, 1916.

Dunlap reports a case of hyperacute shoulder disability in a male adult, with severe pain and spasm, causing the patient to hold the arm tightly to the side and to resist attempts at motion.

An *x*-ray examination "showed in a stereoscopic view a large deposit about the tendon of the supraspinatus, as well as a considerable deposit in the belly of the muscle, showing well back under the acromion process. In this stereoscopic view it was perfectly easy to demonstrate how the deposit lay around the tendon." Since in the past it was thought, and by some men it is still believed, that in cases of subacromial bursitis the lime deposit is *in* the bursa, Dunlap reports this case in support of Brickner's findings in operated cases that the deposit is always *beneath* the bursa, in or around the supraspinatus tendon or, less often, the infraspinatus.

Under nitrous oxid narcosis the arm was abducted and so held for ten days in a plaster of paris cast. Gradual recovery. About two months later pain appeared in the opposite shoulder and an *x*-ray picture showed a deposit there. Fixation of the shoulder was followed by relief.

Gun-Shot Fractures of the Extremities. R. B. Greenough, R. B. Osgood and B. Vincent, Boston. *Boston Medical and Surgical Journal*, January 13, 1916.

From a study of 132 cases, observed in the American Hospital in Paris, the authors derive the following conclusions:

Early and thorough operative treatment is indicated in gun-shot fractures received under the conditions of trench warfare.

The removal of missiles, foreign bodies, and detached bone fragments, and thorough drainage are important.

Complete immobilization in extension is as a rule best obtained in a base hospital by plaster dressings, put on under an anesthetic.

Frequent and painstaking dressings, with or without irrigation, and the maintenance of free drainage are of great importance in overcoming sepsis.

Prophylaxis is better than corrective treatment in the avoidance of ankylosis of joints, and contractures of muscles and tendons.

An Operation for the Correction of the Deformity Due to "Obstetrical Paralysis." W. H. Rogers, Boston, *Boston Medical and Surgical Journal*, February 3, 1916.

Whatever the cause of obstetrical paralysis may be, Rogers is interested merely in the resulting characteristic deformity.

"As the child grows older the deformity becomes more conspicuous, and it is the carrying angle of the elbow that is most prominent. Another result of the deformity is seen when the patient attempts to raise the hand to the mouth. With the direction of the elbow-joint reversed, it is always necessary to raise the arm away from the body to bring the hand up. Also when the patient attempts to use the hand as in picking up any object or in the ordinary handshake, it is necessary first to rotate the whole arm and also to bring the elbow away from the body."

Rogers recommends the operation of Vulpius and Lange. This consists in osteotomy of the humerus about two inches below the shoulder joint, followed by a one-quarter rotation of the whole arm below the line of fracture. In three cases the result was entirely satisfactory both cosmetically and functionally.

Bone and Joint Tuberculosis—A Comparison of Old and New Methods of Treatment. (*Vergleich älterer und neuerer Behandlungsmethoden von Knochen und Gelenks tuberkulose.*) By Prof. D. Theodor Kocher. *Deutsche Zeitschrift für Chirurgie*, August, 1915. Bd., 134; Hft., 1-3.

Kocher makes a complete review of the older and newer methods of treating bone and joint tuberculosis. The results of practically all workers in this field are considered and, in some instances, tabulated. Each joint is separately considered and discussed. In addition to the usual surgical, orthopedic and medical procedures, Kocher dwells at some length upon the design and result of heliotherapy (Rollier's treatment). In general, this long and well-written article (53 pages) offers two chief conclusions: (1) Orthopedic and hygienic measures should be employed exclusively in early cases where the patient may receive the benefit of open air and sunlight treatment. (2) When this is not practical, for social or economic reasons, radical surgical intervention is indicated, the aim being to remove completely the local tuberculous focus.

Significance of Vesical Symptoms in the Diagnosis of Renal Conditions. By William F. Braasch, Rochester, Minn. *International Journal of Surgery*, December, 1915.

The underlying lesion in the kidney may have little or no local symptoms, while the secondary bladder conditions may cause many symptoms. The renal conditions, most frequently the cause of vesical symptoms, are:

(1) Tuberculosis; (2) pyelonephritis, and (3) lithiasis.

1. *Renal tuberculosis.*—Ninety per cent. of such cases had vesical symptoms for longer than six months, and about fifty per cent. for a period longer than a year.

2. *Pyelonephritis.*—Here the cystitis is not so severe as when it occurs with tuberculosis. Each ureter should be separately catheterized and each urine examined bacteriologically. A pyelogram may be of much value in some instances. The functional tests may throw much light, in particular the phenolsulphonephthalein test.

3. *Lithiasis.*—At times the local symptoms may be the predominant ones if the obstruction is high up. However, there is much vesical irritation when the stone is low down. In children, especially with renal calculus, the radiation of pain may be referred largely to the bladder

area. Extra-vesical conditions may cause bladder symptoms, i. e., pressure of a tumor, mechanical interference to the urinary flow, malignant involvement of the bladder, or direct extension of adjacent inflammatory process.

Ureter Stone. (*Ureterstein.*) By L. Adler, *Wiener Klinische Wochenschrift*, No. 51, 1915.

The interesting point about the report of a case of ureter stone was that the patient complained of gynecologic symptoms, chiefly pain without reference to urination. Vaginal examination revealed a very hard tumor the size of a bean, about 2 to 3 cm. away from the uterus on the right side, freely movable and not tender. It was almost in the situation of the ovary, but was somewhat more deeply situated and to the front of the uterus. Cystoscopy revealed the right ureter opening edematous and injected while the catheter entered only 2 cm. and there met an obstruction. By transversely incising the anterior vaginal wall separating the bladder, the right ureter was isolated as in the radical operation for carcinoma. The ureter was incised 1.5 cm., the stone removed, and the wound sewn over tight, reenforced by suture of the bladder musculature adjacent to the ureter incision. Small gauze drain was inserted into the vaginal wound. Postoperative course uneventful. The pain complained of before the operation was totally relieved. The output of urine was increased from 350 cc. to 1,100 cc. Eight days after the operation the right ureter was still seen not to functionate. Catheterization of the ureter at this time was not attempted on account of the fear of disturbing the ureter incision.

Errors in Diagnosis of Renal and Ureteral Calculus. By Hugh Cabot, Boston. *International Journal of Surgery*, January, 1916.

In a study of 153 cases, it was noted that 26 abdominal operations had been done without relief of symptoms which were clearly due to an overlooked calculus in the kidney or ureter. To avoid such errors, Cabot lays down the following rules: (1) In all cases of abdominal pain of a chronic or recurring type, careful, repeated examinations of the urine are imperative, including diligent microscopic examination in all instances whether albumen is present or not. In all female patients a catheter specimen should be examined. *X*-ray plates are essential nearly always.

(2) The possibility of mistaking kidney or ureter shadows in the *x*-ray for other foreign bodies should be excluded by the use of the ureteral catheter, sterescopic plates, injected radiograph or the wax-tipped catheter.

(3) The wax-tipped catheter may lead to a correct diagnosis where the *x*-ray is negative and the urine is normal.

(4) In doubtful cases, if the ureter cannot be catheterized, the decision for or against operation must depend on the severity of the symptoms.

Repair of Small Vesicovaginal Fistula. By Charles H. Mayo, Rochester, Minn. *Annals of Surgery*, January, 1916.

Mayo states that vesicovaginal fistula is not so common as formerly because women receive better care during childbirth. The condition is still occasionally seen when brought about by prolonged pressure during labor. Still other cases are the result of accidental or unavoidable injuries in performing hysterectomies. Some of these fistulæ are best approached by the abdominal route, extraperitoneally if possible, while the larger vaginal fistulæ are best repaired by free incision and good exposure.

Many cases have an opening so small as to be found with difficulty. For these, i. e., a lumen not exceeding one-quarter of an inch, Mayo recommends the following successful procedure: An incision is made through the vaginal mucosa around the fistula. The mucosa is then dissected toward the opening, thus making a small funnel-shaped opening projecting into the vagina. The circular dissection is now deepened, penetrating to the mucosa of the bladder, but not through it. This leaves a small funnel-shaped opening, lined with mucous membrane, which is connected with the bladder mucosa and projects into the vagina. A ligature carrier is passed through the urethra into the bladder, and through the fistula into the vagina, and a suture passed through the walls of the funneled mucosa on each side of the ligature carrier. Both ends of the silk suture are threaded into the ligature carrier which is withdrawn from the bladder and urethra, and in so doing the fistula's track starts inverting. A circular suture of catgut is now applied, and still another is superimposed. The long ends of the suture projecting from the urethra are sutured to the labia. A self-retaining Pezzer catheter is used and the patient rests on her side. The suture from within the bladder either cuts itself out, or may be easily withdrawn by cutting one side where it is attached to the labia.

Concerning the Treatment of Carcimona of the Ovaries which are no Longer Amenable to Radical Operation. (*Zur Behandlung nicht mehr radikal operierbare ovarialkarzinome.*) Thaler and Frankl, *Wiener Klinische Wochenschrift*, No. 51, 1915.

Carcinoma of the ovaries that has reached the inoperable degree has not as a rule been treated by the *x*-ray. The authors report two cases, one occurring in a woman of 62, the other in a girl of 19, in both of whom there was ascites and bilateral ovarian tumors the size of a child's head, metastasis in the omentum on the parietal and visceral layers of the peritoneum, and no attempt at radical removal could be made. As much of the growth as was safe was removed and the patients then subjected to the *x*-ray. In both instances there was a rapid gain of weight and improvement in health, while the residual carcinomatous nodules were no longer palpable. In discussion, Wertheim, Halban and Wagner reported cases of spontaneous disappearance of cancerous nodules in cases of apparently inoperable ovarian carcinoma. While these surgeons resort to the *x*-ray, they nevertheless point out that the good results attributed to its influence should be regarded with caution.

The Treatment of Symptoms Associated with the Climacteric. (*Zur Behandlung der Ausfallerscheinungen.*) Ernst Engelhorn, *Wiener Klinische Wochenschrift*, No. 49, 1915.

Engelhorn maintains that the old-fashioned blood-letting is an excellent measure to overcome such symptoms in the menopause as are referable to disturbances of the circulatory system. The nervous symptoms, the sense of heat, hot flashes, headaches, perspiration, etc., are relieved by the withdrawal of 100 cubic centimetres of venous blood. This is done while the blood pressure apparatus is adjusted to the ovum. In a great many cases as much as 20 points of blood pressure reduction is secured by this method. It may be repeated a number of times if necessary. In certain instances of disfunction of the ovaries in young girls with marked nervous disturbances, this may be of service.

Cauliflower Ear. D. H. Palmer, Seattle, *Journal American Medical Association*, February 5, 1916.

Palmer has tried without success the published methods of treatment until he began to use the present method. Every case he considers to be of traumatic origin, though the degree of traumatism is variable. The commonest cause, in his opinion, is a glancing blow which folds the ear on itself and rolls it against the skull, causing a fracture of the cartilage and its anterior surface where it is most loosely adherent. Hemorrhage accompanying the injury continues, producing the various grades of deformity. The subjective symptoms of the injury are not as a rule prominent. Those of an early case are swelling, discoloration and often local crepitus. In an old case deformity, thickness and rigidity Palmer's treatment is described by him as follows: "After preparing the skin surfaces of the ear, the meatus and immediate vicinity of the face and scalp after any of the approved surgical methods except iodin, which causes intense itching, and plugging the external meatus with cotton, I make an incision under local anesthesia slightly below the prominent part of the swelling through the skin and perichondrium into the hemorrhagic cavity. All clots, newly formed cartilage or bone should be removed with a small gouge or curet, the surface of both cartilage and perichondrium being scraped until smooth. The incision is now closed, except for a small opening which will just admit the end of a eustachian catheter, connected through a waste bottle with a small Pynchon pump. This rapidly removes the accumulated blood, and the suction approximates the loose layer of skin and perichondrium to the cartilage. The skin surface is now thoroughly dried and a fresh plug of cotton is placed in the external auditory canal. A generous coating of sterile petrolatum is now applied over both surfaces of the ear and the adjacent skin of the face and scalp. Should there be any area in which the skin and perichondrium are not perfectly approximated, I make a small mold of dentist's modeling wax or sheet lead and apply pressure at that point. The mold, coated with petrolatum, is now placed about the ear and half a tumblerful of plaster of Paris cream, prepared by an assistant, is poured into the mold, completely surrounding the ear." As the plaster hardens a slight rotary motion of the catheter permits its easy withdrawal and establishment of a drain. The cast is removed by fragmentation ten days after the operation, the ear keeping its shape as adjusted.

Plastic Operations for Acquired Deformities of the Face.

J. S. Horsley, Richmond, *Journal American Medical Association*, February 5, 1916.

Plastic operations require probably more skill than any other kind of surgery, and they especially require ingenuity to meet special conditions and make things fit. General considerations such as age and health of the patient must be given due weight. The age is of great importance, as flaps can be transplanted with a smaller amount of nourishment in the young than in the old. As to dressing, dusting the wound with boric acid powder and leaving it open is all that is necessary. If there is much oozing, a compress of dry gauze may be kept on for a few hours. If any of the facial cavities are involved, hexamethylenamin is given before and after operation to sterilize the secretions. While there are general principles in this work, each case is a law to itself and the greater part of his article is given to the methods which he has found necessary to employ in special cases, too detailed to be thoroughly abstracted. Deformities of the forehead, eyelids, nose, septum, etc., are described.

The Diagnosis of So-called Primary Tuberculous Meningitis. Retention of Urine in the Adult Male Without any Apparent Cause, as a new Pathognomonic Sign.

By D. W. Killer-Moody, Aberdeen. *The Lancet*, January 1, 1916.

The author reports four clear-cut cases of tuberculous meningitis in which there was acute retention of urine. These cases were all adults. The retention was acute and striking; the urine showed no unusual data. There was no pain accompanying this retention and no paralysis of the abdominal muscles. In the author's opinion, acute retention of urine here is a pathognomonic sign of tuberculous meningitis.

A Bloodless Radical Operation for Hemorrhoids.

(*Eine unblutige Radikaloperation der Hämorrhoiden durch einfache Naht.*) By Dr. Tillmaun. *Zentralblatt für Chirurgie*, October 9, 1915.

One or one and one-half per cent. novocaine is used for anesthesia. The hemorrhoidal tabs are seized by Kocher clamps in radial arrangement. A long catgut suture is passed through the tab in front of the clamp and knotted. The free end, with needle attached, should remain long. With this long end a mattrass suture is passed beneath the clamp, through the base of the tab. The latter is now excised flush with the clamp, the instrument removed, the suture drawn tight, and the margins of the wound approximated with the remaining free portion of the suture. Each tab is treated similarly.

Lung Suppuration after Tonsillectomy.

H. Wessler, New York, *Interstate Medical Journal*, January, 1916.

Wessler has observed eight cases of lung suppuration following tonsillectomy during the past year. Inasmuch as during this period 28 cases of lung suppuration from all causes were seen, the percentage from this cause is very large. The symptoms are fairly characteristic. Soon after the operation the symptoms of an aspiration bronchopneumonia set in. About a week or two later signs of suppuration supervene, as indicated by chills, high fever and expectoration of purulent or gangrenous material. Hemoptysis is a constant symptom. Pain is also frequent. In six cases the right lung was affected. Of the eight cases, six were cured spontaneously; one by excision of the affected lode of the lung; one was unimproved. Wessler reports the x-ray findings.

Surprisingly Rapid Success of a Nerve-Operation.

(*Ueberraschend Schneller Erfolg einer Nervenoperation.*) Rudolf Beck, *Wiener Klinische Wochenschrift*, No. 49, 1915.

A man who sustained a bullet wound August 2, 1915, with injury of the right sciatic nerve, suffered as a result of the injury from a complete paralysis of the peroneus nerve with electrical reaction of degeneration. This obtained till September 28 without change, when he was operated upon. A portion of the sciatic nerve bundle, 2 to 3 mm. thick and 2 cm. long, was found bound up in cicatricial tissue. This was removed, the less involved fibres loosened free, suture of the two ends and enveloping of the nerve in a flap of fat and fascia. Twenty-two days later the peroneus paralysis was gone. The patient could flex his ankle 90° and could walk without a cane. The faradic irritability had returned both by the direct and indirect method of stimulation.

The Value of Transfusion in Atrophic and Devitalized Infants and Children.

Louis Fisher, New York, *Medical Record*, February 5, 1916.

In infants of the marantic type, with a gastrointestinal lesion, that precludes successful feeding; and in the profound toxemias following infectious diseases, Fisher believes transfusion is nearly always a life-saving measure. With the modern syringe methods of transfusion, such as the Lindeman, Unger and Lewisohn methods, such a procedure is simple and can be readily performed with a little experience.

Roentgen Diagnosis of Indurated Gastric Ulcer.

By Lewis Gregory Cole, New York. *The American Journal of Roentgenology*, November, 1915.

Two signs are of the greatest importance in this type of ulcer, and these are the hour-glass deformity of the stomach and Haudek's niche. The latter "is an accumulation of bismuth or barium, which has emerged through a penetrating ulcer and been walled off in a pouch on the lesser curvature or posterior wall of the stomach. This niche is even more characteristic of ulcer than is the hour-glass contraction of the stomach."

These two x-ray signs, Cole claims, are found in advanced ulcers, many of which are already malignant, and for this reason the author emphasizes the need of detecting indurating gastric ulcers at a far earlier stage. Cole employs a method of serial roentgenography by which he makes earlier diagnoses.

The Treatment of Large Wound Cavities.

(*Behandlung grosser Wundhöhlen.*) Martin, Vienna. *Deutscher Medizinische Wochenschrift*, No. 51, 1915.

Martin recommends the removal of splinters of bone and other tissue fragments from the wound, then the application of gauze or, better, lint covered thickly with vaseline, to the walls of the wound cavity. Gauze is loosely packed into this lint sac and then a dry dressing is applied. The latter is changed daily at first, and later at less frequent intervals as the secretion lessens in amount.

Appendicitis in the Practice of the General Practitioner. (*Die Appendizitis in der allgemeine arztlichen Praxis.*) Hans Näf, *Wiener Klinische Wochenschrift*, No. 49, 1915

The author has practiced the rule of at once sending patients to operation when pain is complained of either spontaneous or on pressure in the region of the cecum, muscular resistance, increased pulse rate and temperature elevation and vomiting. When pain alone is complained of he puts the patient to bed, on fluid diet and warm applications; no opium, no catharsis. In case of constipation he employs enemata to allay the pain in the side. Should the pulse be accelerated or the temperature be elevated, the pain increase, or should there be muscle resistance or a history of previous attacks, he urges operation at once. In doubtful cases the surgeon should be called in consultation, whose duty it shall be to assume the responsibility of an exploratory laparotomy. In general there will be no occasion to regret an energetic procedure.

The Use of Free Omental Grafts in Abdominal Surgery. By Leonard Freeman, Denver. *Annals of Surgery*, January, 1916.

Omental grafts may be used to replace lost portions of peritoneum. The necessity for such a graft may arise anywhere in the abdomen; the advantage of a free graft rather than an attached portion of omentum is obvious because the latter may cause entangling bands or harmful traction upon the intestines. The graft is of particular value in covering the large, raw surface resulting from the straightening out of a Lane's kink.

Further, omental grafts may be employed to prevent adhesions; to strengthen suture lines in operations upon the stomach or intestines; to act as a substitute for the fascia lata in producing operative occlusion of the pylorus and intestines; finally, they may be used to check hemorrhage from raw surfaces, especially from the liver, spleen and pancreas. The technic for omental grafting is simple. The following precautions should be observed: (1) The pedicle should not be puckered too much when tying off the graft. (2) The large vessels should be avoided. (3) No excess tissue should be removed. (4) The graft should always be "anchored" by a number of fine catgut stitches. (5) The transplant should entirely cover the raw area, and project beyond it.

Pericystitis Complicating Acute Appendicitis. E. Eising, New York. *Medical Record*, January 29, 1916.

Eising reports two cases, in which clinically the dominating symptoms pointed to an involvement of the bladder. In the first case, there was hematuria. At operation a gangrenous appendix was found. In the second case, the symptoms suggested stone in the lower ureter. At the same time a mass was found in the right iliac fossa. At operation, a gangrenous appendix was removed. Eising believes the urinary symptoms were due to inflammation of the areolar tissue surrounding the bladder.

Two Cases of Swallowing of False Teeth Cured by Subcutaneous Injection of Apomorphine. (*Zwei Fälle von verschluctum Gebris durch subkutane Apomorphin injektion.*) Dr. Gerstein, *Münchener Medizinische Wochenschrift*, October 19, 1915.

Two cases in which the individual swallowed 4 false incisors during sleep are described by Gerstein, both cured by the injection of .005 apomorphin. The patient is placed upon his abdomen, the chin extended. Five minutes after the injection spasmodic vomiting sets in and in both cases the false tooth plate was expelled after the second spasm. Vomiting continues a few minutes longer.

The Bone-Plating Problem: Report of 200 Cases. Wm. O'Neill Sherman, Pittsburgh. *Interstate Medical Journal*, January, 1916.

During the past six years, with a fracture service of 3,100 cases, Sherman found it necessary to resort to the use of steel plates and screws in two hundred cases. The Lane plate and wood screws, used in the early cases, were mechanically and structurally faulty and have been discarded for the vanadium plates and tap screws. These have corrected many of the difficulties encountered with Lane plates and screws.

That the majority of plated fractures become infected and that in many cases it is necessary to remove the plates, is no indictment against the same use of the steel plates and screws. The majority of failures can be attributed to faulty judgment in the selection of cases and gross errors of technic. If one's technic is perfect, we can confidently expect healing by first intention in the majority of cases. The infections, to a great extent, are due to the failure to exclude the skin from the field of operation.

Much has been said about the retarding of bone repair and the prevention of callus formation where steel plates and screws were used. While it is sometimes true that repair is delayed to a certain extent, this contention has been exaggerated.

An elaborate equipment, i. e., extension apparatus, Hawley fracture table, and a large instrument armamentarium, is absolutely necessary if the operation is to be thoroughly and dextrously performed. There are few surgeons equipped with the necessary instruments to carry out in detail the technic which is so necessary if successful results are to be obtained. The average hospital does not have a sufficient number of these cases to justify the outlay of money necessary to purchase the instruments.

If non-union is more frequent today than formerly, it is due to the indiscriminate plating of fractures where operation was not indicated and where conditions were not favorable for rigid asepsis. Ward patients who are anemic, luetic, alcoholic, obese, and those having a low resisting power, are poor subjects for the bone-plating operation. It requires a maximum of resistance, both local and general, if the best results are to be secured.

Notwithstanding the various warnings repeatedly given, that the operation should be deferred from ten to twelve days from the time of injury, the majority of surgeons are operating immediately, apparently disregarding the undeniable danger of infection.

The autogenous inlay operation is the one of choice in non-union cases. It remains to be demonstrated whether or not it is preferable to use steel plates in recent fractures; one serious objection is the difficulty of the operation. The vast majority of fractures that Sherman has plated have been rather difficult to hold in position with steel plates and screws. If a muscular spasm has been strong enough to break steel plates and screws, it is not reasonable to assume that bone-grafts would withstand the strain.

There were two hundred operations in Sherman's hospital service where steel plates and screws were used, with no deaths or amputations as a result of the operation. In no case was there sufficient pain or discomfort to necessitate the administration of a sedative. There is usually little or no pain where accurate anatomical alignment has been secured. Approximately one hundred cases were compound fractures. In this series, there were four infections; firm union taking place in all four after the infection subsided. There were three cases of non-union in the compound group.

In the simple fractures (105 cases), there was but one infection; this occurred in the upper third of the femur and at a time when a series of infections seemed to be arising from a common source in the operation room, which, however, was not discovered. There were no cases of non-union in the simple fractures.

In the first fifty-five cases where Lane plates and screws were used, seventeen plates and screws were removed, eleven compound and six simple fractures. In the last one hundred and fifty cases, including simple and compound fractures, where the vanadium plates and tap screws were used, seven plates have been removed; all of these, with one exception, were compound cases.

These results were secured by having absolute control of the patient from the time of receipt of the injury until his arrival at the hospital. While a great majority of the patients sustained extensive trauma to the bones, soft parts and skin, it must be remembered that the foreign material in the wounds of the cases reported is practically sterile. Cowe, iron-ore or coal is usually sterile.

The end-results of the operative treatment have been far superior to those of the conservative formerly employed. There have been many cases in which two or more plates have been satisfactorily used which formerly would have been amputations. Permanent disability has been markedly reduced; the majority of the injured have resumed their former occupations in the steel mills and mines. The fact that these patients are able to resume their former positions is sufficient evidence of the practical advantages of the steel bone plates and screws over former conservative methods.

With few exceptions, all patients operated upon were favorable subjects from a physical standpoint, each having passed a medical examination before being employed. To this and general surgical supervision must be given much credit for the results secured.

Syphilis of the Stomach. George M. Niles, Atlanta. *Journal of the American Medical Association,* February 19, 1916.

Niles, reportinng a case of syphilis of the stomach in a man of 28, notes the difficulty of differentiating the condition from cancer of the stomach and emphasizes the value of the Wassermann test in these conditions. Syphilis of the stomach is more frequently recognized now than formerly, and Lockwood, in 1913,. estimated that there were on record then about fifty cases of gastric syphilis. Nonspecific ulcerative conditions, however, may occur as frequently in syphilitics as in normal persons. It is said the late Hunter McGuire once said that much of his success was due to the fact that in obscure cases of disease he treated the patient for syphilis, and Niles thinks that many long suffering dyspeptics who have suffered all kinds of treatment without cure might receive benefit from specific treatment for syphilis.

Syphilis of the Stomach. E. D. Holland, Hot Springs, Ark. *N. Y. Medical Journal,* February 26, 1916.

Holland reports two cases of gastric syphilis resembling carcinoma, in every clinical detail, one of them operated upon with the latter diagnosis.

Venous Thrombosis and Embolism: Its Cause, Significance and Consequences. Angus McLean, Detroit. *Pennsylvania Medical Journal,* February, 1916.

Several etiological factors are usually given as necessary for the formation of a thrombus: (1) Trauma, especially injury to the endothelial lining; (2) stagnation or slowing of the blood-stream; (3) chemical changes in the blood itself, and (4) infection. Of these causes not one is alone sufficient to produce a thrombus. We are, therefore, forced to look for some other etiologic factor in cases of femoral thrombosis following clean appendicectomies, etc. With the hope of finding some explanation for the thrombotic process in these cases, McLean undertook some experiments on dogs.

He was much impressed, in these experiments, with the tremendous amount of injury a vein can withstand without the production of a thrombus at the site of injury.

He reports the following interesting observations:

1. When a vein is ligated in continuity the blood in the vein will clot only on one side of the point of ligation; that is, the side from which the blood is coming.
2. In ligating a vein between two ligatures (say two inches apart) the blood between the ligatures clots very slowly, and if left for a week or more the contents of the ligated vein will have entirely disappeared, a fibrous cord-like structure alone remaining.
3. The same result is accomplished by ligating an artery between two ligatures.
4. Simple crushing of a vein will not cause a clot at the point of crushing. The crushing can be repeated in forty-eight hours and a clot will not form at the site. Examination of the repeatedly crushed vein two weeks after the last crushing will show a thickening of all the coats of the vein due to an increased amount of fibrous tissue, the intima remaining as smooth and glistening as before.
5. Crushing a vein with the subsequent introduction of a twenty-four hour bouillon culture of staphylococci, and again crushing the vein to grind (as it were) the staphylococci into its walls, did not produce a clot or thrombus at the site.
6. The introduction of a sterile thread into the lumen of a vein, allowing but one-half to three-quarters of an inch to remain suspended inside of the vein, that is, oscillating in the blood stream, failed to produce a clot or thrombus either at the point of the introduction of the thread or around the sterile thread itself.
7. A sterile thread introduced into the artery in the same way and allowed to remain there for four, five or seven days will not cause the formation of a clot on the thread itself nor upon the wall of the artery at the point the thread was introduced.
8. The introduction into a vein of a thread infected with staphylococcus albus or aureus will in three or four days cause the formation of a thrombus at the point of the introduction of the infected thread. The thrombus becomes attached to the vein at the point where the infected thread enters. It will not entirely occlude the lumen of the vein; it will grow or enlarge in the direction of the blood stream, remaining suspended at a single point.
9. A thread infected either with the colon bacillus or with the staphylococcus aureus, introduced into an artery, cause the formation of a firm clot as proved by post-mortem findings five days after the introduction of the thread.
10. Sterile threads, one-half an inch long, "let go" in the circulation, caused no symptoms.
11. An infected thread (colon bacillus) one inch long, let loose in the circulation, caused a death in three and one-half days. Post-morterm examination showed a seropurulent fluid in the pleural cavity and the embolus (thread with blood clot, infected with colon bacillus, around it) was found in the right lung.

Upon examination of an induced thrombus of this kind it can readily be seen how easily such a thrombus could be torn from its small frail attachment, circulate in the blood stream and become lodged somewhere in the pulmonary circulation and perhaps produce a fatal termination just as happened in experiment above.

Rôle of the Lymphatics in Ascending Renal Infection: Preliminary Report. Daniel N. Eisendrath and Jacob V. Kahn, Chicago. *Journal of the American Medical Association,* February 19, 1916.

In nearly all previous animal experiments on this subject conditions were established, such as ligation of the ureter, injection into the renal pelvis, etc., which seldom exist clinically. The authors have attempted to imitate the conditions that actually occur in the human being by injecting an emulsion made by mixing the scrapings of agar slant cultures of the organisms commonly found in urinary infections with sterile salt solution into the bladders of animals. After cleansing of the genitalia, preferably of female animals, a number 4 or 5 (French size) ureteral catheter, which can be boiled, was inserted into the bladder, some of the urine taken for cultures and then an emulsion of bacteria injected. Injuring the bladder or ureters was avoided. Paraffin sections were taken from a number of places in the bladder and kidney and every portion of the ureter was cut longitudinally as well as serially, no areas being omitted. Summarizing their results, they find that the inflammatory infiltrations follow closely the lymphatics. In the early stages the submucous layer of the bladder is affected and then it can be followed up into the ureter, where it is most marked in the lower portion in its submucous coat. A little further up the periureteral sheath plays an important, if not chief, part in transmitting the infection upward and as the infection progresses other coats become invaded from without inward, and in the kidney pelvis the infiltration is first seen in the subpelvic areolar tissue, and again around the blood-vessels which pass into the parenchyma, and the tubules in the cortex and medulla. In six out of twenty-seven experiments, pure cultures of the organism injected into the bladder were obtained from the renal pelvis. The authors also report the study of the urinary organs in dogs and in rabbits used as controls, but find no evidence of infection.

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THE CARE OF ABDOMINAL SURGICAL CASES.*

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When asked a few weeks ago to prepare a ten minute paper, I could think of nothing that would be of more interest than a relation of the method I have learned to employ as a result of many years of work at my clinic at the Polyclinic. When I began my service as an assistant at the clinic in 1885, we used the old cumbrous methods, drastic purging, elaborate preparation of the patient and the site of operation, antisepsis instead of asepsis, drainage when in doubt (and in nearly all cases we were in doubt) a crude technic with its necessarily high mortality and morbidity, the so-called stimulation of the patient by strychnia and digitalis, and enforced immobility of the patient with many weeks in bed. A gradual evolution has led to the reversal of most of these conditions and to an increasing simplicity in the management of abdominal cases until, during the last few years, we have treated them substantially as I shall now describe, with a great fall in the mortality and morbidity, a great lessening of post-operative pain and discomfort, and practically an entire absence of post-operative hernia.

It must be understood that all the measures I am about to describe must be considered as subject to criticism and a change when something better may be found. With better training for our younger surgeons, with increased knowledge of the simplified and perfected technique which will eventually prevail, morbidity—and with it, mortality—from purely surgical causes should drop almost to the vanishing point.

The patients are first seen, examined, and treated at the dispensary of the Polyclinic, so that we have knowledge of their general physical, as well as of their pelvic and abdominal conditions. If operation is considered necessary, they are admitted to the hospital and prepared; the preparation usually being very simple and consisting of a mild laxative on the morning of the day preceding the operation, followed by an enema the evening before, together with the preparation of the skin.

Severe purging is avoided as being unnecessary and weakening as well as a source of great discomfort to the patient I would strongly emphasize this point, as there are still many who employ drastic measures to clean out the intestinal tract. One very prominent surgeon of my acquaintance gives as a routine six compound cathartic pills the day before operation, followed by repeated ememata until the rejected fluid comes away clear; and many others follow substantially the same plan. There is no doubt in my mind that severe purging increases the tendency to bowel distension and gas, is a source of great discomfort, and increases post-operative intestinal atony, nausea and vomiting. Ask any convalescent patient who has gone through both methods of preparation, which has given her least discomfort both before and after operation, and she will not hesitate in her answer.

Only rarely are patients held in the hospital for more than twenty-four hours before operation. Usually the evening before operation the abdomen is shaved and scrubbed with tincture of green soap and warm water, rubbed on with a piece of clean gauze. The soapy water is carefully and completely washed off and the skin is dried with alcohol and covered with a light dressing of sterile gauze. When the gauze is removed before operation, the dry skin is painted with three and a half per cent. tincture of iodine. In emergency cases the preliminary preparation may be omitted and the operation safely performed a few minutes after the iodine painting.

A moderate Trendelenburg position is used in nearly all cases except acute appendicitis and where there is reason to fear some valvular lesion of the heart or degeneration of the cardiac musculature. An intermuscular or the suprapubic transverse incision is used in nearly all cases. The transverse incision has been found to give most satisfactory results, with great freedom from hernia and an inconspicuous scar Its greatest fault is the liability to the formation of hematomata from imperfect or careless hemostasis.

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* Read at a meeting of the N. Y. Academy of Medicine, February 24th, 1916.

Gentleness of manipulation is strongly urged; no rough handling or sponging of peritoneal surfaces is allowed. Where it is necessary to hold back intestines or to protect them from probable infection, broad gauze pads wrung out of normal salt solution are used; otherwise gauze is kept out of the peritoneal cavity. Vessels are ligated before being divided and clamps are never applied except to tissues that are to be removed; I believe this to be an important means of avoiding thrombosis and consequent embolism. Great care is taken to repair all torn or denuded peritoneal surfaces. It is certain that the less peritoneal surfaces are handled or exposed to the drying influence of air, the more gentle all necessary manipulations can be made, and the more carefully peritoneal breaks are repaired. the less will be the complaints from postoperative adhesions.

No. 1 or 2 plain catgut is used in the peritoneal cavity, doubled where greater strength is necessary, as in mass ligature of the broad ligaments. No. 0 or 1 chromicized gut is used for intestinal work and occasionally fine silk, celluloid linen being discarded as dangerous and liable to produce late complications. Abdominal incisions are closed in layers with No. 1 plain catgut for the peritoneum and usually No. 2 ten-day chromicized gut for fascia and No. 0 or 1 plain catgut for the skin. Where there seems danger of wound infection, through-and-through silkworm gut sutures are used in median incisions in addition to the catgut layer sutures.

Before the patient is taken off the table, she is given a hypodermatic injection of atropine sulphate gr. 1/120, followed in a few minutes by one of eserine salicylate gr. 150. The eserine can be repeated at six hour intervals, as may be needed. It is found to have a positive effect in relieving postoperative pain. and in helping to blot out the recollection of pain. It lessens nausea and shock, and promotes intestinal peristalsis. To produce the best effect, it should be given before the patient is taken from the operating table. Morphia is needed to control pain in only one case in four and then rarely in more than one dose of a sixth or a quarter of a grain. Eserine should not be used in larger doses than 1/50 gr., or at shorter intervals than four to six hours, as it is easy to harm by over-stimulation of the unstriped muscle. It should also be remembered that where there is actual obstruction eserine is dangerous.

After a long anesthesia the stomach is washed out at the end of the operation. If there is vomiting, water with a little bicarbonate of soda is given freely by mouth and, when the condition will permit, the head and shoulders are raised. To relieve shock, to supply fluids, to promote peristalsis, and to control thirst, a half pint to a pint of pure water is given by rectum every four hours until the bowels move or until the patient can take fluids freely by mouth. Twenty grains of aspirin are often given with the water and apparently it has the same effect in relieving pain or nervousness as a sixth of a grain of morphia. The bowels frequently move spontaneously; if they do not, castor-oil is given on the third or fourth day; as a rule, no other medication is employed.

After operation, the patient is allowed from the first to turn in bed or to be moved by the nurse. On the fourth day, unless there is some contraindication, she is lifted out of the bed into a chair for a short time, say a half hour. The time out of bed is gradually lengthened, as the patient's strength increases, to an hour or more twice a day and the patient is encouraged to take a few steps so that by the end of the week she is able, easily and usually smilingly, to walk from the ward or room. It is found that early mobility encourages the patient. lessens nausea. promotes the early return of appetite, increases peristalsis, makes the use of the catheter seldom necessary, makes the bowel movements easier so that there is less need of laxatives. improves the respiration, lessens the tendency to pulmonary complications, prevents loss of muscle tone and greatly facilitates a rapid convalescence.

It is to be emphasized that getting the patients up in this way does not mean that they are to be out of bed all day, or are to be allowed to go to work in a week or two weeks, or that they are not to have the benefit that comes from rest and good feeding, but it does mean that the little periods out of bed greatly help toward these desirable ends. When patients are sent home early from the hospital, as they usually have to be because of the crowded wards, they are to be kept in bed most of the day for another two weeks, or longer if any special reason exists. With a transverse incision no special bandaging is needed; with a vertical incision a many-tailed bandage of adhesive plaster was always applied before the patient was allowed up and was worn when the patient left the hospital. With these precautions, we have not seen the late neurasthenic conditions. hernias, or other ill-results that have been said to follow early rising.

To show broadly the results obtained at the clinic by the use of these measures. I have asked Dr. Tovey. who was first assistant at the clinic, to go over the records of the five hundred abdominal cases preceding my resignation from the clinic, and tabulate the operations, the time of being allowed out of bed, time of discharge from the hospital and the deaths and complications, which tabulation I append. It is understood, of course, that each case is noted under what was considered its most important head and that in very many a number of other operations were performed at the same time, as, for instance, an appendicectomy in every case where its performance could be done without increasing greatly the risk to the patient.

Operation	Average Day Out of Bed.	Average Day Out of Hospital.	Remarks.
17 Radical hysterectomies (Wertheim) for cancer	6th day	14th day	3 deaths: 2 septic 1 exhaustion
5 Myoectomies	6th "	13th "	
67 Supra-vaginal hysterectomies for fibroids	5th "	12th "	1 septic pneumonia, recovered
6 for intraligamentous fibroids, of which one proved to be sarcoma	5th "	15th "	
1 Hysterectomy for uterus bicornis with rupture of pregnant born	8th "	14th "	
1 Hysterectomy for double uterus with ectopic	2nd "	8th "	
1 Hysterectomy for carcinoma of ovaries	9th "	14th "	
50 Hysterectomies for double pyo-salphinx	4th "	9th "	2 deaths: 1 pneumonia 1 septic
2 Hysterectomies for ectopic	4th "	10th "	
139 Salpingectomies	4th "	10th "	
79 double:			
7 for tuberculosis.			
26 both ovaries removed.			
43 one ovary removed.			
10 no ovary removed, but in six cases resected.			
33 one-sided:			
9 remaining ovary resected.			
14 salpingo-oophorectomies, one-sided.			
13 for ectopic.			
21 Ovarian cysts	4th "	10th "	1 death from intestinal abstruction.
11 were double.			
10 single, of which eight were intraligamentous.			
57 Retroversions	4th "	10th "	1 death from embolism of lung.
5 Cesarean Sections	8th "	12th "	
2 Ureterotomies	7th "	14th "	
44 Appendicitis	4th "	10th "	1 death from general peritonitis, ambulance case.
21 acute.			
23 chronic.			
1 Suprapubic cystotomy	6th "	14th "	
1 Abscess of prevesical space	6th "	14th "	
15 Kidney operations	6th "	9th "	1 death from ileus.
4 Nephropexy.			
10 Nephrectomy.			
1 Decapsulation with drainage.			
24 Hernias	6th "	13th "	
7 were umbilical with lipectomy	5th "	16th "	1 death from embolism on the 6th day.
5 were umbilical simple	5th "	14th "	
6 were post-operative:			
4 ventral repaired by transverse incision	5th "	9th "	
2 repaired by overlap.			
1 primary union, but recurred	14th "	21st "	
1 gall-bladder incision	14th "	21st "	
3 femoral	5th "	9th "	

Operation.	Average Day Out of Bed.	Average Day Out of Hospital.	Remarks.
3 inguinal	5th "	9th "	
19 Gall-bladder and liver	7th "	14th "	
13 cholecystostomy.			
5 cholecystectomy.			
1 tumor of liver, resection. Gumma.			
4 Gastro-enterostomies	7th "	18th "	1 death from embolism on the 8th day.
1 Resection of Cecum	10th "	20th "	
1 Lateral Anastomosis for fecal fistula of descending colon and sigmoid	20th "	28th "	Left hospital with fistula, which later closed spontaneously.
2 Suppurative diverticulitis	15th "	22nd "	
17 Adhesions about colon, pylorus, duodenum, and ileus, "Lane's kinks," "Jackson's membrane"	4th "	9th "	
3 Exploratory.			
500 Cases with 11 Deaths: Complications.			
Deep wound infection 6			
Skin infection 13			
Hematoma 10			
Fecal fistula with spontaneous healing 2			
Hernia 1			

THE LOCATION AND CAUSE OF LIME DEPOSITS ASSOCIATED WITH SUBACROMIAL BURSITIS: "EXCISION OF THE BURSA."

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(From the 3rd Surgical Service.)

In an article entitled "Prevalent Fallacies Concerning Subacromial Bursitis. Its Pathogenesis and Rational Operative Treatment" (*American Journal of the Medical Sciences,* March, 1915), I referred to the following fallacies:

1. That thickening of the bursal wall casts a shadow in the roentgenogram.

2. That the calcareous deposit found in many of the cases is *in* the bursa.

3. That subacromial bursitis often arises from vaguely conceived bacterial or "toxic" irritation.

4. That subacromial bursitis is marked by decided swelling in the deltoid region.

5. That there is a characteristic point of tenderness over the outer aspect of the shoulder just below the acromion margin, and that the absence of this sign indicates, clinically, the absence of bursitis.

6. That the routine operative treatment to be recommended is "excision of the entire bursa."

"A personal study of over one hundred cases of shoulder disability, including nineteen that showed this calcareous deposit roentgenographically, seven of which I operated upon," led me to report the following conclusions in respect to these fallacies:

1. A much thickened bursal wall casts no roentgen shadow. The shadow is due to a calcareous deposit.

2. The calcareous deposit is not *in* but entirely *beneath* the bursa, in or on, or in and on the supraspinatus tendon, or occasionally, the infraspinatus near its insertion.

3. "The assumption of a bacterial or toxic origin for subacromial bursitis has never been substantiated by any evidence. * * *

"Excluding the rare tuberculous form described by Bilhaut (of which I have seen but a single instance), and the purulent type occasionally occurring metastatically in septic processes (of which I have operated upon three cases), I believe that subacromial bursitis is of traumatic origin, and that it is produced by bruising the structure between the acromion and the greater tuberosity (over which latter the adhesions and the thickening of the bursal wall are most often found). When, as is frequently the case, the underlying tendon is likewise contused or torn, the lime salts deposit in the area of necrosis that develops in this poorly vascularized tissue."

4. In the early stages there may be swelling due to serous effusions in the bursa. In later stages swelling in the deltoid region is unusual. More often there is a decided flattening due to muscle atrophy.

5. Tenderness over the outer aspect of the shoulder just below the acromion, where it is usually sought for, is as often absent as present [more often absent]. The site of tenderness I find most constant in subacromial bursitis is anteriorly, *over the lesser tuberosity*.

6. The recommendation in text-books to "excise the bursa" is to be condemned if, as is unlikely (*vide infra*), the authors mean literally to "excise the bursa."

"The subacromial is one of the largest bursæ in the body. Above it is adherent to the under surface of the acromion process and the coraco-acromial ligament wherefrom it is reflected onto the joint capsule. Below it is adherent to the inner surface of the deltoid muscle, extending fully one and a half inches distad to the greater tuberosity. Anteriorly and posteriorly, it encircles almost one-half the circumference of the humerus, and is attached by its under surface to the bone, the joint capsule, the biceps sheath and the tendons of the subscapularis and the spinati. Surely, the complete removal of this extensive, intimately attached structure would be an imposing task! For an attempt to perform it I can conceive but a single indication—tuberculosis."

All of these conclusions have been supported by the further study of a large number of cases and, especially, by my observations in, to date, fifteen operations.

These calcareous shoulder deposits occur, it seems, only in adults. Probably some metabolic disturbance predisposes to their formation (sometimes they are re-absorbed); and, since the condition is not a rare but a fairly common one, it is worth determining, if possible, what that disturbance is. In order to do this there must, however, first be a clear conception of the pathologic anatomy of these deposits and the associated bursitis. I am, therefore, led to revert here to my findings, for I have been misquoted as believing that all these cases should be operated upon, and because I still hear roentgenologists and surgeons speak of "the shadow of a thickened subdeltoid bursa" and "calcareous deposit in the bursa." In the *Journal of the American Medical Association*, January 22, 1916, a Chicago physician, reporting a single case operated upon by him, stated that the shadow of the deposit was too far from that of the humerus to be within the tendon, that he found this deposit in the outer wall of the bursa, and that he extirpated the bursa (which he recommended, from his single experience, as the best treatment). Although these mistakes of observation and deduction were forestalled in my article above referred to, I have replied to them in the *Journal of the American Medical Association*, March 18, 1916, page 912.

It is clear that those who recommend "extirpation of the bursa" mean thereby (as the above author now admits) merely the removal of the diseased portion—a very different procedure and, in my experience thus far, an unnecessary one.

In my article on "Prevalent Fallacies," etc., I said: "The shadow * * * may be * * * separated by a wide space from the bone," and in another article[1]: "It may be very large * * * or appear to follow more or less evenly the line of the bursa. It is this latter appearance, especially, and the faulty observation, at operation, of Painter, that have led to the generally accepted notion that the lime formation is in the bursa." My operative findings in fifteen cases and the findings of other surgeons—Dunlop of Washington, Frank of Louisville (personal communications), Codman, Wrede—satisfy me that the calcium deposits are beneath the bursa.

As I have previously pointed out, unless a precise dissection is made, it is easy indeed, and at one's first operation it is perhaps usual, to reach the conclusion that the lime deposit when lying immediately beneath and adherent to the floor of the bursa, is within the bursa (or its outer wall), for the two layers of the bursa are apt to be quite adherent over the deposit, and the wall is often very thin.

This is the mistake that was made by Painter; and Codman, standing by, made note of it. Much the same mistake of interpretation was made in the first operation I witnessed and referred to in an early paper.[2] This very point I discussed at some length in the *American Journal of the Medical Sciences:*

"It is not difficult for one who has performed the operation to understand why Painter made this faulty observation. If the dissection is not made with this point in mind, it is easy, especially in adherent cases, to inadvertently cut into the floor of the bursa with the same incision that divides the roof, thus allowing the often cheesy deposit beneath to flow out apparently from within the bursa."

As I have said, in the further study of this curious affection, it makes a vast difference whether we proceed with the conception that the lime salts deposit in and upon a tendon under the bursa, or with the assumption that this occurs in the bursa.

Calcareous deposition in a bursa does not occur, as far as I am aware, elsewhere in the body, either in acute bursitides, or in chronically inflamed, thickened bursæ, as the olecranon or the prepatellar. But calcification is a familiar process in necrosed tissues, and it has been described not infrequently in tendons that have undergone necrosis, as from trauma, or from infectious emboli, as described by L'Hermite and others.

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[1] Brickner: Shoulder Disability: A Further Study of Its Varieties and Their Treatment. Interstate Medical Journal, April, 1915.

[2] Brickner: Shoulder Disability. American Journal of Surgery, June, 1912. "At operation by Dr L[illegible]t all sterile pus was evacuated from the bursa, adhesions were broken down, and a calcareous deposit in the floor of the bursa and in the supraspinatus tendon was cut away with scissors."

This corresponds with the tendon lesions found by me and with those reported by Codman. It has been clearly demonstrated in studies of my cases by Moschcowitz[3], who found necrosis of tendon tissue with deposition of lime salts in the area of necrosis, associated with granulation tissue.

It is the consideration of these pathological experiences, as well as my operative findings and Codman's reports, that has led me to the *belief* that the *provoking cause* is probably an injury to the tendon. It can be demonstrated at operation, by abducting the arm, how easily the supraspinatus tendon and the bursa may be squeezed between the acromion and the humerus. Sometimes there is a distinct history of an external trauma, sometimes a history of an internal violence by abduction (as hanging a picture, throwing a ball, etc.). But most often, to be sure, there is no history of injury or strain. This does not disprove, however, the hypothesis of a mild tendon injury, for, as I pointed out:

> "Such common movements are often not associated by the patient with his developing shoulder disability, not only because they are so commonly performed, but also because the pain, and especially the stiffness, may not seriously attract his attention for a few days thereafter. But we must not depend entirely upon careful anamneses of these cases for evidence that such forms of internal violence can seriously injure the bursa and the tendon. Codman has reported two cases he operated upon of complete rupture of the supraspinatus tendon and tear of the bursal floor, produced respectively, by throwing a heavy blanket over a clothesline, and by tightening a saddle-girth. In both cases something was felt to snap in the shoulder, and the arm fell limp."

A bacterial or toxic origin for these cases of subacromial bursitis, from tonsillitis (as has been suggested) or other source, has not been supported by clinical or other evidence. If such an etiology were common we ought to find the condition more often after tonsillitis and we ought to find it also in other bursæ of the body. In my cases, including one operated upon eleven days after the injury (sudden lurch of the body while hanging to a car strap), neither pus cells nor bacteria were found.

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[3] Moschcowitz: The Histopathology of Calcification of the Spinatus Tendons as Associated with Subacromial Bursitis. American Journal of the Medical Sciences, July, 1915

CONGENITAL CYSTIC KIDNEYS—ETIOLOGY AND CLINICAL INFERENCE, WITH REPORT OF A CASE.

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The following notes and pictures are for the most part excerpts from standard authorities, principally Adami, Kelly and Burnam and Braasch, which I have consulted as an aid to unravel the status of a condition in a patient which was regarded a fibroid tumor of the uterus and proved to be a congenitally cystic kidney. And not until seven months after operation, when the remaining kidney had greatly enlarged, was the condition recognized as congenital.

From excerpts of Adami we gather that congenital cysts of the kidney are due to imperfect or arrested development of the glandular organ. Reviewing the subject, he states that occasionally birth is rendered difficult by the huge size of the fetal kidney, or, following birth, death ensues quickly from obstruction to the action of the diaphragm by greatly enlarged kidneys. At other times the condition is less extreme and is partial, and the individual may reach maturity; these are the cases that interest the surgeon.

Although rare, this condition has long been recognized.

Occurrence.—Kelly and Burnam say: "The disease is met with principally in two periods of life, immediately before and after birth (Fig. 1) and after 40 years of age (Fig. 1-A). Sieber (*Deutsch. Zeittschr. f. Chir.*, 1905, XXIX, 469) in a series of 173 cases found 107 occurred between the ages of 40 and 60. In our own clinical memoranda we find 8 cases, all between the ages of 42-57, all in women and all bilateral. Between birth and 20 years old, Sieber was able to find in the entire literature 32 cases." My patient at the time of operation was a woman 37 years old. "The disease is a little commoner in women than in men. Some influence has been ascribed to heredity. Osler observed cases in mother and son (*Practise of Medicine,* 1905, 6th Ed.). Höhne (*Deutsch. medizin. Wochenschr*, 1896, XXII, 757) in mother and daughter. The disease is rare, as shown by the fact that Garceau found but 10 cases in 2,429 autopsy records of the Boston City Hospital. Lizzato (La degenerazion Cisticadu reni, Venizia, 1900) in 226 cases found that 185 were bilateral. Sieber in his report of 150 autopsy records, found that 140 were bilateral. That the disease is nearly always bilateral is well illustrated by the almost invariable recurrence in the opposite kidney, after nephrectomy."

Pathology.—As a rule, while both kidneys are affected, they are not equally involved. The kidneys are usually converted into a mass of cysts and dilated channels, varying in size from those first visible to the naked eye to others the size of a marble or plum and larger. "In these cases the renal tubules or the larger proportion of them are found not to communicate with the pelvis, and a layer of dense fibrous tissue occupies the region of the calices; above this the tubules are dilated and cystic" (Adami). The cysts are scattered throughout the entire kidney, particularly, however, in the cortex and in the two poles of the kidney. Their proportionate size and appearance are well shown in my specimen (Fig. 2). The large cysts are formed by coalescence of smaller ones. Kelly and Burnam again say: "The contents is more frequently clear fluid, which may become darkened by hemorrhage. The clear fluid is quite watery and contains usually traces of urea. The cyst wall is made up of a thin layer of fibrous tissue, upon which is set a single layer of cuboidal epithelium. This epithelium is frequently thrown into folds and projections simulating papilloma. When these little inversions are present the cystic contents are particularly marked by the large number of cells, which are quite free. This proliferation of cells is an evidence of the activity of cell growths, proving that the disease is a progressive one. The secretory part of the kidney lies between the cysts, and although most markedly changed by a process of parenchymal atrophy and overgrowth of fibrous tissue in every way identical with those of chronic interstitial nephritis, it is preserved to a remarkable extent, which accounts for the ability of the organ to functionate sufficiently to sustain life. The arrangement of kidney parenchyma in relation to the cyst wall is shown in Fig. 3. The congenitally cystic kidney in early life and adult life is identical as to etiology."

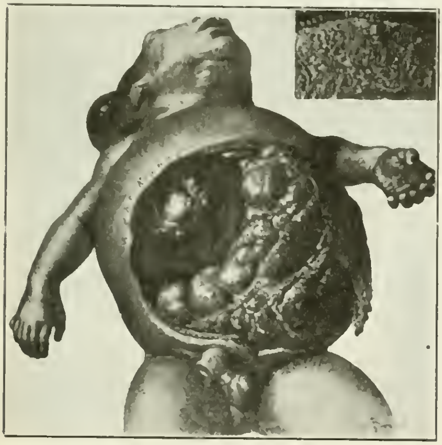
Fig. 1. Bilateral congenitally cystic kidneys in a still-born child. (Kelly and Burnam.)

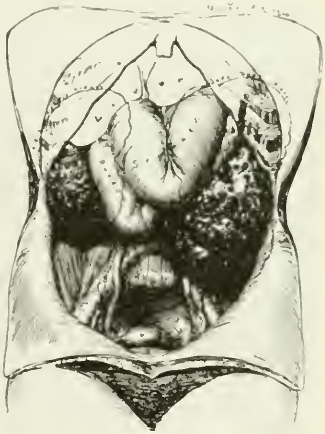
Fig. 1A. Bilateral congenitally cystic kidneys in the adult. (J. H. H. Autopsy No. 1258, March [illegible])

Etiology.—Adami mentions the long continued debate as to the cause of congenitally cystic kidneys. Virchow regarded them as due to fetal inflammation, affecting the medulla and leading to constriction and atrophy of the terminal portion of the collecting tubules; others have regarded the condition as adenomatous. The consensus of opinion at the present time is that we are dealing with a condition of arrested development, the essence of which is that in embryonic development a perfect union of the tubules of the renal vesicles with the primary collecting tubules has failed. Continuing the review Adami states that observers are widely at variance as to the exact nature of that arrested development, although the more exact studies of Schreiner and Huber, made with the aid of reconstructions of serial sections of fetal kidneys, by Born's wax plate method, as again of Herring, would seem definitely to have settled the matter. The original view of Remak and Kollicker, accepted by a long list of later observers, was, that the whole of the renal tubules arise as evaginations and branches from the Wolffian duct. According to this view congenital cysts of the kidney can be brought about only by obstruction of the tubules after their formation. Virchow, taking this view, ascribes the obstruction to inflammation of the medulla.

So long ago as 1865 Kupfer recognized a separate origin for Bowman's capsule, and the convoluted (collecting) tubules, and his researches have been confirmed by a succession of embryologists of repute. The researches prove (1) that the first indication of the fetal kidney is an evagination from the Wolffian duct near the cloaca. This evagination elongates and becomes bulbous at its end. The stalk is the future ureter, the ampulla expands longitudinally and is the *anlage* of the future pelvis and collecting tubules (Fig. 4). (2) Running alongside of the Wolffian duct is a cell mass of mesenthymatous origin, the nephrogenic tissue: at the upper end this gives independent origin to the Wolffian tubules, below the renal ampulla penetrates into the mass. (3) The elongated ampulla (pelvis) gives rise to pairs of evaginations or branches, which proceed to dichotomise, developing the future collecting tubules. (4) The swollen or ampullary end of each branch becomes surrounded by a segregated mass of the nephrogenic tissue and in the inner zone of the tissue there now form cell collections developing into vesicles, renal vesicles, secretory tubules. (5) These vesicles elongate and fuse into the collecting tubules, so that their lumen opens into the ampullary ends of the collecting tubules. Elongating still further and becoming S-shaped, the distal end, by invaginating gives rise to Bowman's capsule, with its containing glomeruli. The other portion of the S gives origin to the first convoluted tubule, the loop of Henle and the second convoluted tubules—in fact to all the secretory portions of the renal tubules.

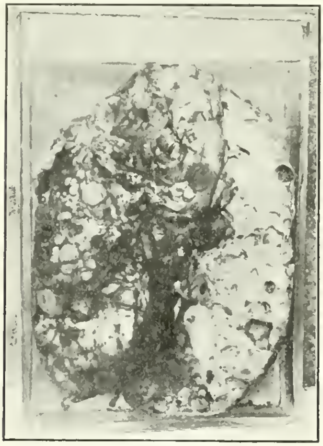

Fig. 2. Specimen of kidney from the case here reported; measures 9 x 5 x 4 inches; note the typical gross pathology.

While thus an inflammation of the medulla in the later months of fetal life might bring about obstruction, the simpler explanation of the congenitally cystic kidney is, that of want of relationship or fusion between the renal vesicles (secretory) and the outgrowth from the Wolffian duct (collecting). If the nephrogenic tissue proceeded to form renal vesicles without the renal ampulla proceeding to dichotomise and form the collecting tubes, we should expect a case of universal cystic degeneration of the kidney. We do encounter kidneys of this order—kidneys with no pelvis and again kidneys with pelvis, but no signs of medulla or of collecting tubules. Again, when the juxtaposition in the act of fusion is only more or less universal or partial as the case may be, we could expect also cases exhibiting in general a well-formed medulla and collecting tubules, but with these scattered cysts due to local independent development of the mesenchymal renal vesicles without fusion with

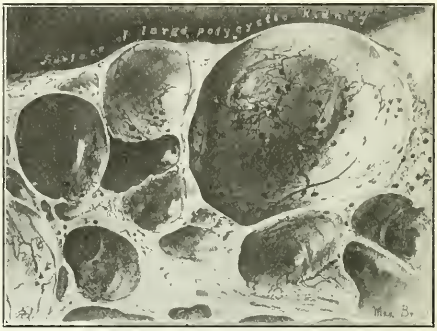

Fig. 3. Section of portion of large polycystic kidney. The arterial system is injected, showing that well-preserved glomeruli are present in great numbers and in all parts of the cortex, even in the thinnest septa, which explains the fact that such cystic kidneys are capable of maintaining the renal function to a remarkable degree. (From Kelly and Burnam.)

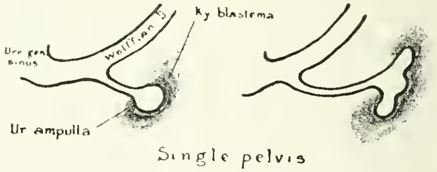

Fig. 4. Diagram illustrating the development of the two kidney anlagen. (Kelly and Burnam.)

the collecting tubules, and as a matter of fact we encounter these cases.

Conclusions.—Not all polycystic kidneys are congenitally cystic; some, perhaps a considerable proportion of isolated cysts, are retention cysts, the renal tubules dilating as a result of obstruction—acute cystic dilatation of tubules as the result of acute parenchymatous nephritis resulting from blockage of the narrower descending loop of Henle by the shedded cells of the first convoluted tubules. It is rational to believe that interstitial fibrosis, by contraction and obliteration of the lumena of tubules may lead to similar obstruction cyst formation. It is striking how frequently these scattered cysts are associated with chronic diffuse nephritis. But it is plausible to consider, from an etiological standpoint, all congenitally polycystic kidneys are bilateral, and due to lack of fusion between the secretory and collecting tubules; whereas an acquired cystoma is the result of a blocking in that portion following inflammatory changes and may be bilateral though not necessarily so, it is not congenital and consequently not due to lack of fusion. These are acquired polycystic formations in the kidneys, unilateral or bilateral as the case may be, in contradistinction to the congenital variety which is always bilateral.

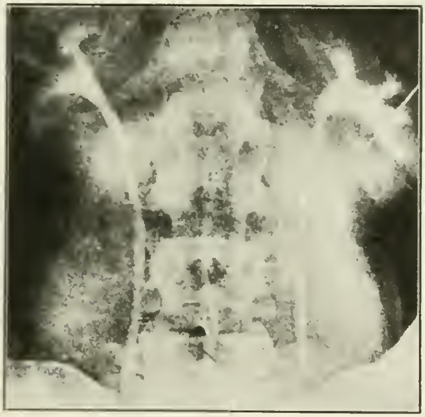

Fig. 5. Roentgenogram showing normal pelvis. (From Braasch.)

History of Case: Woman, 37 years old, married when 20 years. One child at the age of 21, normal delivery. Has never had any illness. She has always menstruated regularly, never excessively, and never had pain during her periods. Two years ago, patient began to notice that her abdomen began to increase in size, especially over the lower left quadrant. She experienced a feeling of fullness, colicky pains which were on the increase, hesitancy in urinating, and increasing constipation. Abdominal examination revealed a hard indurated mass in the lower left quadrant. The mass was moderately moveable, fairly regular in outline, 5 x 8 inches approximately. Bimanually examined, the mass was regarded as intimately connected with the uterus and was diagnosticated a myoma of the uterus, urine was negative, as were also all other physical signs.

Operation. April 24, 1913, an incision 5 inches long was made over the left rectus. Immediately upon opening the abdomen the mass, exposed, was recognized as a polycystic left kidney, and owing to lack of appreciation of the pathological condition, the organ was removed. The right kidney was palpated, and as it seemed normal in size, it was regarded normal in texture. The abdomen was closed and the patient made an uneventful recovery. Discharged May 11, 1913. It was not until the following November that the true nature of the condition was recognized. Hitherto the condition was regarded as one of unilateral polycystic kidney. But on November 17, 1913, the patient presented herself with the statement, "I believe another tumor is forming on the right side." On examination this fact was established and the diagnosis finally fixed—bilateral congenitally cystic kidneys—proving what other observers have noted, that while both kidneys are affected, they are not equally involved, and when one kidney is removed the other rapidly develops in its cystic tendency.

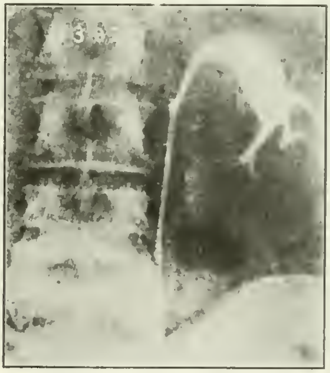

Fig. 6. Roentgenogram showing polycystic kidney. (From Braasch.)

The blood pressure of the patient has been repeatedly taken since operation, varying from 140 to 160. Previous to operation, the kidneys not being suspected, the blood pressure was not taken. A functional test of the remaining kidney by means of phenolsulphonephthalein injected intravenously was made December 30, 1915. The dye returned in 3 minutes and there was a total output of 22 per cent. in a half hour, showing that the kidney functionated normally.

Cause and Symptomatology.—Congenital polycystic disease of the kidney is a progressive, non-self-limiting disease. In the early cases the progress is rapid. Most of the fetuses are born dead, due to the great impediment which they occasion to labor. Those that survive birth almost invariably die in a few days, due to asphyxia from pressure upon the diaphragm or uremia. Those who reach maturity usually die with symptoms simulating those of chronic interstitial nephritis. We find Kelly and Burnam quoting from F. V. Milward (*Burmingham Med. Rev.,* 1904, VI, 476), who divides the adult cases into three stages. (1) Progressive enlargement of kidneys with no other symptoms, and may continue in this manner from a few months to years. (2) Attacks of colic and pain of dragging nature in the kidney, with symptoms of renal insufficiency, such as headache, dizziness, disturbance of vision, anorexia, flatulency, diarrhea—in fact, all the symptoms of chronic interstitial nephritis. (3) Increase of all renal symptoms of insufficiency, up to uremia, convulsions and coma. In the third stage there is high blood pressure and the left heart is hypertrophied, characteristic of interstitial nephritis. Some die of apoplexy.

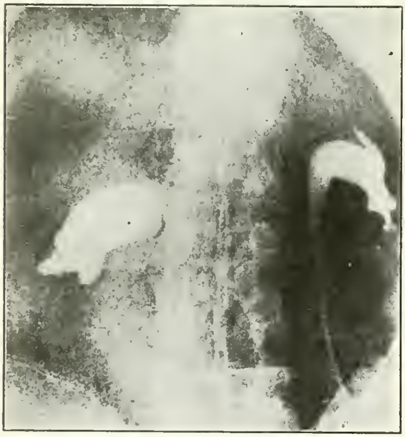

Fig. 7. Roentgenogram showing polycystic kidney. (From Braasch.)

In the early stages the urine is normal, in the last stages there are marked polyuria and low specific gravity. Renal insufficiency may be shown by the functional test methods. In the early stages the test shows nothing. In one of the cases I saw, which turned out to be one of congenitally cystic kidneys proven by operation, the symptoms were those of renal colic; there were marked lassitude, pain in the kidney regions radiating to the ureter, severe colic, with passing of blood, and my diagnosis was renal calculus, with recommendation for operation.

Diagnosis.—When unevenly developed or one side alone is prominent, we must consider hypernephroma—renal tumor, pyo- and hydronephrosis. The urinary and bladder examination will usually clear up a hydro- or pyonephrosis. By means of pyelography, using colloidal silver solution, Braasch has recently made most accurate differentiation between hypernephroma and congenitally polycystic kidney. The pelvis is frequently markedly deformed in each. In contradistinction, however, to the narrow necks of the calicus, noted in hypernephroma, in congenitally cystic kidneys they are wide and flattened out (Figs. 5, 6, 7).

Treatment is symptomatic. The organ should not be removed, as even the most attenuated layers of medullary substance have glomeruli which are functionating; therefore a removal of the organ would reduce the general efficiency. It is perhaps best to puncture the cysts, and this may be necessary repeatedly. It must be borne in mind that inasmuch as this class of cases suffers more or less from renal insufficiency, death from uremia may be caused by ether anesthesia.

A REVIEW OF THE PRESENT STATUS OF SURGERY IN CERTAIN KIDNEY CONDITIONS.*

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Pousson,[1] who has made elaborate studies of the accomplishments of surgery in pathologic conditions of the kidneys, as a result of his recent researches has changed his views in regard to the operative treatment of acute nephritis, and thinks that decapsulation and nephrotomy may cause the elements still intact to proliferate and replace destroyed areas: If there are much fever, oliguria, albuminuria, and leucocytosis, these are indications for operation. For chronic nephritis Pousson combines decapsulation and nephrotomy—decapsulation in less severe cases, and nephrotomy when there is severe uremic trouble, edema or oliguria. His operative mortality in such cases is 13%.

In chronic nephritis, even if there are no grave symptoms, if it interferes with social or business life, he advises operation after failure of palliative treatment. This includes Bright's disease when the urine does not contain much albumin or casts and the urea contents are decreasing. In twenty-four cases of chronic nephritis in which he operated the fatal outcome was delayed for periods varying from two to fifteen months.

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*Read before the Jefferson Co. Medical Society, Birmingham, Ala., Jan. 24, 1916.

In chronic nephritis Pousson considers that persistent oliguria is the clearest indication for surgical interference. This acts not so much on account of the abundant diuresis provoked as by its action in removing urinary chlorides.

Considered from the azotemic standpoint he thinks that the determination of the ureic constants of Ambard indicates not only the limits to which kidney operation is indicated, but that it distinguishes the causes of retention of urea and other poisons from troubles due to hydric retention.

In an able, critical article on the end-results of nephrectomy Pousson[2] says that experimental research has shown that in cases of nephritis there is no formation of new elements, but simply an augmentation of those that already exist. Excretion of urinary chlorides and phosphates which diminish for some days after operation rapidly increase thereafter. These same results follow in the case of man, when nephrectomy is done for an acute or chronic nephritis, suppurative or otherwise. In many patients examined long after the nephrectomy there is notable increase in the size of the remaining kidney. Histologic and autopsy findings verify this. Urinary examination shows a complete restoration of the renal function in most cases. The study of renal function permits division into two classes:

(1) Those who have entirely recovered their physiological function;

(2) Those who retain functional trouble, more or less.

The latter is probably less due to any nephritis in the remaining kidney than to the lesion for which operation was done.

Clinical results have shown that the nephrectomized resist perfectly intoxication and infections. Nephrectomy suppresses sources of infection and permits the healthy kidney to recuperate its functions.

Kümmell[3] considers that there are two classes which justify operation.

(1) The acute and subacute nephritis. These include such as toxic nephritis, the nephritis of scarlet fever, eclampsia, hematogenous infections, etc.

(2) Chronic nephritis.

In the acute group the hematogenous infections demand nephrectomy as the operation of choice. In the other forms coming under "acute and subacute" nephritis decapsulation of the kidney will usually give good results.

Kummell operated in twenty-eight cases of acute nephritis: 17 nephrectomies and eleven nephrotomies.

There were three deaths, one from infection, and two from uremia.

In the chronic group there are three varieties which call for intervention on account of the poor results of medical treatment.

(1) Painful nephritis;

(2) Hemorrhagic nephritis; and,

(3) The form corresponding to Bright's disease.

Nephrotomy, or decapsulation have given good results in Kümmell's operative cases. He says decapsulation should be tried first, and if this is not sufficient then nephrotomy.

The subject of renal infections is of paramount importance in present day renal surgery. Eisendrath[4] has written a very comprehensive paper showing the various clinical aspects of renal infection. This may occur in one of four ways:

(1) Hemotogenous;

(2) Urogenous, the micro-organisms being carried up into the kidney pelvis with the stagnant urine;

(3) Lymphogenous, from the lymphatics of the bladder per the ureter to the pelvis and lymphatics of the kidney;

(4) The connection of the lymphatics of the colon with those of the kidney.

Infection may occur from a calculus blocking the ureter. Both acute hemotogenous and urogenous forms may be unilateral.

The most reliable evidence of renal infections are obtained by the cystoscope and ureteral catheter.

Re-formations of renal calculi in kidneys which are the seat of chronic colon bacillus infections are not infrequent, and they will reform as long as the infection is present.

Primary nephrectomy, if the opposite kidney is capable of doing the work of both, is to be preferred to a conservative method in advanced cases of renal infection. In hyperacute cases nephrectomy should be performed as early as possible. In the acute cases, whether hematogenous or urogenous, conservative measures should at first be tried. Even a nephrotomy with decapsulation and puncturing of the little abscesses may save the kidney. But one should not wait too long with such conservative treatment and if prompt response is not obtained nephrectomy should be performed.

Cunningham[5] referring to acute unilateral infections of the kidney, says there are two types:

(1) Multiple miliary abscess formation;

(2) Diffuse inflammatory process without suppuration.

The first produces rapid toxemia and high temperature with other signs common to abdominal infections. The treatment is nephrectomy.

In the second division the inflammatory process is characterized by exudates and is more commonly due to invasion of the kidney by the colon bacillus. Progressive toxemia is absent and the other symptoms are less prominent. Palliative treatment is indicated and operative interference is called for only when there is clinical evidence of progression to the point of lowering the general resistance by toxic absorption.

Decapsulation, splitting the kidney and drainage, is then indicated.

Foster[6] thinks that nephrectomy must be the operation of choice in acute nephritis with abscesses or pronounced toxemia. Fourteen such cases were treated by Brewer[7]. Of eight in which nephrectomy was done all recovered. Four treated by nephrotomy and two without operation all died. In very mild cases decapsulation and drainage suffice.

Pawlicke,[8] treating of acute infective nephritis, considers that nephrectomy should be resorted to only in exceptional cases of suppurating kidney, and recommends decapsulation.

Brandenburg[9] inquired of many of the leading German surgeons as to the value of decapsulation in acute nephritis and uremia. There was some doubt expressed as to its value, although all agreed fairly well that it was a rational intervention, and declared that in acute, even suppurating nephritis, or in toxic nephritis, etc., i. e., in cases of acute anuria, the operation was of distinct value.

Lloyd,[10] basing his opinion on 121 reported cases, of which forty-one were stated cured and fifty-three improved, thinks that decapsulation is justifiable in cases of chronic Bright's disease that have resisted medical treatment, the mortality being about 10%.

Foster[11] thinks that in acute infections of the kidney nephrectomy rather than decapsulation is indicated.

The time-honored operation of nephropexy, which at one time was held in such high esteem, seems to have lost a great deal of its former popularity.

In a discussion in the Surgical Section of the Royal Society of Medicine (London), Mills[12] reported on his experience of nephropexy during the last four years. Of ninety cases that were operated upon, fifty-seven have been followed up. The kidney has remained fixed in 76% and has remained mobile in 24%. Subjective symptom recoveries show inferior results: Recoveries in 33%, amelioration in 10%, no amelioration in 57%.

Billington stated his mortality was less than 1%, i. e. four deaths in 800 nephropexies.

Blakeway giving the statistics of St. Bartholomew's Hospital said that of forty patients traced, twenty-four reported good results, fifteen were not satisfied, one was only partly satisfied. In eight cases there was recurrence of the mobility.

The Guy's Hospital records showed seventeen recoveries out of twenty-six cases.

The St. Thomas Hospital records showed good results in 51% of the cases, with fairly good results in 17%.

Marion[13] (of Paris) in reporting on the end-results of nephropexy stated that he followed a modified Albarran method utilizing flaps of capsule. In twenty-six cases which were watched for a long time there were no bad results. In all the cases the pain was lessened, or suppressed, and other subjective symptoms were ameliorated. He thinks that only a movable kidney complicated with crisis of strangulation, accompanied by hydronephrosis or hematuria, etc., should be fixed, unless the kidney is painful. In this event it should be fixed regardless of other complicating factors.

Scherck[14] thinks that fixation of a movable kidney is indicated in only a few cases. The organ is normally mobile to a great extent and to rigidly fix it is erroneous. Besides, most of the procedures do not succeed in removing the condition for which the operation is done.

It is unfortunate that the present methods of examination and the symptoms present are often very misleading as to the real gravity of the kidney situation, and do not always clearly indicate the necessity for immediate surgical action.

Schmidt[15] refers particularly to infections of the kidney which may be marked but the insidious action of which demands urgent surgical treatment, as temporizing only exposes the patient to grave dangers.

He thinks it possible for an acute unilateral nephritis to occur which will not only destroy that kidney, but may spread to the other. Operative measures are indicated to limit the progress of such destruction. The operation selected must depend on the circumstances.

Bremmerman[16] points out, on the other hand, that renal surgery has advanced so that guess work is supplanted by definite knowledge. Exploratory incision is relegated to regions of unscientific work. The *x*-ray, perfect cystoscopy, and determination of kidney function render it possible in a majority of cases to clearly outline the causes of pathology of the genito-urinary tract.

The surgery of the kidney and genito-urinary tract has advanced more in the last decade than any other branch of surgery from the standpoint of diagnosis and treatment. The work is on a scientific basis; the mortality has been markedly reduced; the end-results are better.

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Intracranial Hemorrhage from Traumatic Rupture of the Middle Meningeal Artery.

The injury in the cranial vault itself, when this exists, is an unmistakable guide to the seat of hemorrhage. The majority of the cases are associated with marked fracture. It is only when there is no external lesion of the vault itself that Kronlein's and other guides to the pterion are really necessary for the localization of the artery. However, a previous training in the exact localization of the pterion is quite valuable, and it is so simple it should be easily remembered.

Capillary trephining is of little or no value, and should not be resorted to.

In concluding, I would like to add my voice to the cry for immediate exploration and decompression in all doubtful cases. The latter-day technic of cranial surgery is such that a decompression operation will positively add no more risk to life, and, in most instances, will bring to a happy termination what would have otherwise been a fatality. —Lucian H. Landy in the *Southern Medical Journal.*

CRITICISMS IN THE DIAGNOSIS OF GASTRIC ULCER.

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With all the progress made in improving our diagnostic methods and refinements in the interpretation of certain phenomena we have no absolute sign of the presence of an ulcer.

With the advent of certain laboratory aids and the adoption of roentgenology, we were entitled to the belief that the diagnosis of this lesion would be comparatively easy, but since the introduction of the latter and after sincere consideration of its true value as a diagnostic aid we must moderate our optimism and remain satisfied with it in a more limited way.

Every ulcer, irrespective of its location, begins as an acute ulcer which undergoes certain changes transforming it into a chronic ulcer, with which we are better acquainted. The acute ulcer we rarely ever see, for unless it occurs on either the cardiac or the pyloric sphincter it gives no symptoms. These acute ulcers are really erosions limited to the mucous and submucous coats of the stomach and they heal spontaneously in the great majority of cases.

In a previous communication I reported the production of such acute ulcers or erosions in thirty-one patients from whom pieces of mucous membrane of various size were abstracted while aspirating the stomach contents from the patient in the fasting condition. In no one case after lengthy observation did a patient give any evidence of the presence of an ulcer.

I would like to emphasize the order, which in my opinion should follow in every case before a diagnosis of gastric ulcer is made; the relative importance of the value of each part of the examination being shown by its comparative position in our diagnostic consideration: first, history; second, physical examination; third, laboratory findings; fourth, roentgenological examination.

In assigning a consideration of the *history* to the first position I am prompted by the fact that in no field of medicine does the history play so important a role as in diseases of the digestive tract. Too much time cannot be taken in listening to the patient's recital of his symptoms, both past and present: pain—its character, location, time and length of occurrence; the influence of pain by food intake, use of alkalies, and by position of the patient; vomiting—its relief of pain, its character, quantity and quality; constipation, loss of weight, etc.; previous attacks of a similar or dissimilar nature—a consideration of all these leading to a proper interpretation of cause and affect.

The question of pain plays a most important rôle, for it is extremely difficult to conceive of the presence of an ulcer, an eroded area in the stomach mucosa without the presence of pain. But that such may occur is shown by the appearance of acute ulcers as mentioned above, and by such cases where perforation occurs without any preceding symptoms whatsoever. Pain that can be considered as characteristic does not occur until the ulcer has thickened to some extent. Acute ulcer does not, except under unusual circumstances, give rise to pain or other symptoms. One cannot discuss the diagnosis of acute ulcers from any other point of view than that of hematemesis or perforation.

Two conditions most commonly associated with gastric pain are ulceration and cramp. Observations of patients with gastric ulcer have shown that even weak acid introduced into the stomach causes pain. The pain from ulcer is explained by Lennander as a result of inflammation of the lymphatic vessels and glands that drain the affected region. The painful cramp is attributed to a strong contraction of a part of the stomach which stretches the parietal serosa either directly or through the mesenteric connections. The beliefs formerly held that pain was caused by the presence of an increased acid fluid, or by the passage of acid chyme over the ulcerated area, are now disregarded, as well as the idea that the time of occurrence of pain was influenced by the location of the ulcer, namely, that in ulcer nearer the cardiac end the pain occurs much sooner than in ulcer near the pylorus. Cannon called attention to the fact that pain is caused by two factors, viz., peristaltic contraction and inflammation of the lymphatics.

Pain in ulcer of the stomach, irrespective of its location, rarely occurs sooner than fifteen minutes or more than three hours after eating, is of a burning or cramp-like character, persists for at least from one to two hours, is not relieved by the position of the patient nor the taking of food. It is relieved, however, by vomiting, aspiration or lavage, and very frequently by the taking of alkalies. The pain very rarely appears at night in contradistinction to gall bladder affections where night pain is the rule. The use of orthoform, cocaine and other analgesics for diagnostic purposes is too unreliable to warrant any consideration. Pain recurs in attacks separated by intervals of comparative freedom varying in length. There is no doubt that pain is the most important subjective symptom, and may be the first to attract the attention of the patient to his gastric lesion. It must be regarded as a cardinal symptom.

Hematemesis or melena may be an early symptom, but the vomiting of blood does not always signify ulcer, and even a very profuse hemorrhage cannot always be regarded as a cardinal symptom.

Whenever a patient relates a story of repeated vomiting, particularly of food eaten some hours previously, with gastric pain, we may reasonably suspect the presence of an ulcer.

In the *physical examination* the most importance is to be placed on the question of tenderness whenever present. When the ulcer has given rise to local inflammation of the parietal peritoneum pressure on the inflamed area produces pain, for it has been shown that pressure is an adequate stimulus to the inflamed subperitoneal tissue. As the tenderness is due to inflammation it is largely independent of spontaneous pain. In considering the true value of tenderness we must always investigate the sensory status of the patient. Libman observed that if we make firm pressure over the styloid process of the temporal bone, in the hypersensitive person we can elicit a rather marked reaction evidenced by the contraction of the facial muscles, and even crying out, significant of pain, while in a hyposensitive patient this reaction is barely noticeable. This test should always be applied when determining how much estimation should be placed on the patient's recital of pain intensity, for the hypersensitive will always exaggerate much more than the hyposensitive individual.

If only tenderness in the epigastrium is elicited in a hyposensitive patient, much value must be placed upon it as a diagnostic sign. When a tender point is present it must be consistent—in other words, if the examining finger is kept on the tender point and the patient's position is turned to either side this tender point disappears and then reappears when the dorsal position is resumed. The persistence of the same epigastric point of tenderness, even on changing the position of the patient, argues against the presence of an ulcer.

It was formerly thought that the tender area corresponded to the site of the ulcer, as for example, tenderness over the left lower dorsal region signified an ulcer on the posterior wall; this can now be disregarded as of absolutely no value. Tenderness, whenever present as described, must always make us suspect some degree of inflammation, but as the latter reappears or subsides, so tenderness in ulcer may be present or absent. Consequently such tenderness is a valuable aid as a diagnostic sign.

Laboratory findings: In the application of the stomach tube we must admit that assistance may be had from studying the gastric contents, when considered together with the history and physical examination. Laboratory findings in themselves, even when properly interpreted, should never lead to a conclusive diagnosis of ulcer. The stomach tube gives us information as to motility and secretion, and must be employed in the fasting condition, and after the test breakfast.

In order to properly estimate motility the patient should receive a proper meal at least seven hours before the contents are aspirated. Normally the fasting contents should contain 20 ccm. or less, acid or neutral in reaction, and any amount in excess is regarded as abnormal. If an ulcer were on or very near the pylorus, the motility would undoubtedly be interfered with in direct proportion to the amount of stenosis caused by either the inflammatory or the cicatricial tissue present. This naturally influences the amount of gastric content found in the fasting stomach. Frequently the retained food may be seen microscopically; when not so observed, the microscopic examination must be employed, and often we are rewarded by the finding of muscle tissue, varying amounts of starch, easily seen with the addition of an iodine solution to the slide. This microscopic finding of food-remains is now not regarded as so important for the diagnosis; several clinicians regard the presence of such microscopic results to be a normal phenomenon.

Ulcers around the cardia, lesser and greater curvatures at a distance from the pylorus interfere less with the motility and the amount of gastric content except in the case of an hour-glass stomach, where similar phenomena may be observed. It is now an accepted fact that the secretion is not hyperacid in all cases of ulcer, and at the same time there is no doubt that in the majority of cases hyperchlorhydria is the rule. In a small number of cases sub-acidity may even be present.

In determining the quality of the gastric secretion an arbitrary test breakfast, the Ewald-Boas, is employed the world over. In titrating the stomach contents in order to determine the acids the personal equation must enter, for no two individuals will titrate exactly the same, and while we read in terms of percentage acidity the differences may be due to using the filtered or the unfiltered stomach contents for titrating; the difference may also be due to varying conceptions regarding end-reactions.

It is my rule to titrate the filtered stomach contents in all cases. Of late Rehfuss and his coworkers have introduced a method, that of fractional titration; the results are somewhat at variance with the accepted method of acid determination. One hour after ingestion of a test meal the acid was considered at its height, but Rehfuss has shown that acidity may be highest several hours after a test breakfast. It has also been proved by means of the roentgen-rays that the complete removal of the gastric residuum with the aid of the usual stomach tube is by no means certain. Rehfuss has also shown that the heretofore accepted idea of the residuum of the empty stomach as 20 ccm. cannot be maintained. He found that in one hundred normal cases there was an average of over 52 ccm. of residuum present in the fasting condition. This throws an entirely new light on the residue in the diagnosis of gastric conditions, particularly of ulcer.

It is hardly necessary to speak of the fallacy of depending on the results of but one test meal, and no conclusion should be drawn unless it is repeated at least twice.

The presence of blood in the gastric secretion, either macroscopically, microscopically or chemically, i.e., occult, is of no significance, for trauma by the use of the stomach tube may produce it. Blood in large quantities when evacuated through a stomach tube or vomited is of a double significance when accompanying pain and tenderness.

Occult blood as seen in the stool after the patient has been on a meat-free diet for a long enough time and when all other reasons for blood presence can be eliminated is one of the most valuable aids in diagnosing the presence of an ulcer. The presence of blood as shown by hematemesis is neither a pathognomonic nor a cardinal symptom. There are many other conditions that may account for the blood. It is a well-known fact that profuse hemorrhage may occur from the mucous membrane of the stomach apart from gastric ulceration, as for example, in severe anemia, in the purpuric group of blood diseases, in acute specific fevers, and in diseases of the liver and kidneys. Hale White described a condition which attacks mostly young adult females, i.e., oozing of blood from an intact gastric mucous membrane, and also in the absence of any other disease in which bleeding is likely to occur, which he termed gastro staxis. This entity, however, is not to be accepted.

A chronic gastritis may give rise to the vomiting of blood. It is now recognized that epigastric pain and vomiting may be due to a chronic disease of the appendix and also when, in this condition, hemetemesis may occur. The hemetemesis in a chronic appendicitis may be due in some cases to an acute ulcer of the stomach, but in others to a chronic gastritis which may be an independent condition. Hemetemesis may occur as a result of the rupture of the varicose veins of the esophagus or stomach, such as exist in hepatic cirrhosis or enlargement of the spleen, and also from the rupture of a dilated artery, as seen in arterio-sclerosis. It may also occur in gastric congestion, inflammatory or mechanical resulting from venous obstruction. Boas states that without occult blood we should not diagnose ulcer. This is not an accepted fact, but one can say where occult blood is persistent we can conclude that the ulcer is in an active state. A continuously positive occult blood finding is valuable for a decided ulcer diagnosis, whereas a negative result signifies nothing.

It is now believed by experienced roentgenologists that it is impossible to diagnose an ulcer by the roentgen-ray. Most observers fix the existence of an ulcer by the presence of certain indirect symptoms; viz., spastic constriction in the greater curvature and delayed motility. From a critical viewpoint we must concede that in the interpretation these indirect symptoms are of far less clinical value than can be inferred from the anamnesis, from the use of the stomach tube and the examination for occult blood. Spastic constriction in the stomach wall is not an absolute consistent sign. Frequency of its recurrence is very variable. When present, it is of value in interpreting the existence of an ulcer of the lesser curvature, but it does not enter into consideration of the pyloric ulcer.

Delayed motility is of importance only in considering the presence of a pyloric ulcer. It is only in these two conditions that these indirect symptoms, as interpreted by the application of the roentgen-ray, have any reliable value. It is self-evident that both of these roentgenologic findings have an important value with the clinician when he combines them with his clinical observations.

Callous ulcers and penetrating ulcers occupy a special domain in the roentgenological examination for gastric ulcer. It must be concluded that where there is a callous ulcer, the retraction of the neighboring part of the gastric wall produces a change in the outline of the stomach. This important and frequent retraction was first described by Haudeck as a "nische." This is brought about by the filling of the crater-like ulcer by means of bismuth or barium, forming small diverticulum-like pouches as seen on the roentgen screen. This small cavity is always a direct and pathognomonic symptom of a callous ulcer on the lesser curvature. The frequency of this "nische" sign is very much exaggerated.

A constantly persisting hour-glass stomach repeatedly observed through the screen is significant of the presence of an active ulcer in the immediate vicinity of the side of constriction. It is often very difficult to determine from the roentgen-ray examination when a callous ulcer penetrates into one of the neighboring parts.

For the diagnosis of a simple gastric ulcer the roentgen-ray examination is of very limited value. The use of the stomach tube and stool examination give much more information. As mentioned above, roentgen examination is of greater value in clearing up the diagnosis of callous and penetrating ulcers. The specific value of the roentgen-ray is seen in the interpretation of the hour-glass stomach; all other methods for the diagnosis of this condition are valueless in comparison.

The roentgen-ray examination should be employed only when a chronic ulcer has been diagnosed, and then only for corroboration. It is distinctly of value to the clinician and to the patient that the former do his own fluoroscopic examination, but this is not necessary where there is a working connection between the clinician and roentgenologist. Too much value must not be placed on the roentgenological examination alone, and it is not to be absolutely relied on unless repeated at least once.

It has been our experience that a fair number of cases have shown all pathognomonic signs of ulcer, as revealed by the history, by the physical examination, chemical examination, and roentgen-ray examination; in fact, they have given us almost positive evidence of the presence of an ulcer. These patients were then turned over to the surgeon and after laparotomy we were amazed to hear the surgeon say that no ulcer was present. The conclusion of a surgeon that no ulcer is present is not to be accepted unless the stomach itself is opened and carefully inspected. The surgeon comes to his conclusion undoubtedly by the palpation of the stomach and according to his idea as to whether an infiltration is present or absent, a scar is present or absent, a crater-like area is present or absent, he gives his opinion. From this we must conclude that another personal equation enters into consideration. What one surgeon would consider an infiltration or induration would be passed over entirely by another as of no consequence, and consequently the operator with the greater experience in surgical pathology is more likely to interpret correctly what he feels, than the one who has less experience. This accounts in a way for the large number of ulcers diagnosed by some surgeons as compared with others. It also accounts for the varying statistics as to the frequency of an ulcer. The surgeon may explore, and though the ulcer be present, he may not recognize it.

We can say that in some cases even with a positive history, physical examination, chemical examination, and exploratory laparotomy, an ulcer may still be present, though not recognized.

Conversely, with all the findings positive, there is in a minority of cases no ulcer found when the stomach is completely examined.

From these two statements, we can conclude that at the present day there is no absolute diagnostic sign of the presence of a gastric ulcer. Only a probable diagnosis is possible.

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SOME PROBLEMS IN OBSTETRICS: CESAREAN SECTION; HIGH FORCEPS; PITUITARY EXTRACT.

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Pituitary extract supposedly has a decided effect in stimulating the contractions of the bladder, and in stimulating or giving force to intestinal peristalsis. I have personally found very little need for it in the bladder cases, since in the female, catheterization is so readily carried out that it insures us an empty bladder with a minimum of difficulty and with practically no danger of infection, if urotropin be used systematically.

As regards the action of pituitrin on intestinal peristalsis, I can speak of its effect and its value with the greatest of certainty and assurance. In post-operative cases, often as a routine procedure, it has a very beneficial effect in starting the intestinal activity as an aid to enemata or drugs given by mouth. In post-operative cases, symptoms simulating intestinal paresis often are overcome easily and smoothly by repeated hypodermatic injections of pituitary extract.

As a general stimulant in post-operative cases, it is of the greatest value, taking a position on a plane with caffein, strychnine, digitalis and camphor. I have used it in quite a number of Cesarean section cases in small doses repeated several times a day for several days after operation. It has not only an excellent effect upon the uterus, but at the same time its influence on the intestinal canal can be readily recognized. Just so soon as the incision is begun into the abdominal wall in Cesarean section an injection of pituitary extract is given. Its effect in contracting the uterus after the extraction of the fetus and the placenta is marked, there is no bleeding at all from the sides of the wound, and the interior of the uterus bleeds only in the slightest amount. The contracting effect upon the uterus is very rapid, so rapid in some cases that the extraction of the child through the uterus is rather difficult. It renders the sewing of the uterus a most simple procedure, readily carried out with a minimum loss of blood and time.

Another reason for continuing its use in Cesarean section cases, is because of its stimulating action on the secretion of the breasts. After Cesarean section, I do not limit myself to pituitrin alone. I give these and all other post-partum cases ergotole for long periods. In the third stage I always use ergotole, no matter how much pituitrin may have been given before. I give one drachm as soon as the baby is born, and half a drachm in half an hour. Then ergotole is continued for several days, often alternating with pituitrin. I am using pituitrin in these cases because I believe it has a good effect on the breast secretion.

Opinions vary as to the value of this drug during the emptying of the uterus in abortion. In my experience it has no marked action, at least no rapid action, though I use it practically in every case. It may perhaps have some influence in diminishing the amount of blood lost, but just as in the cases where ergotole is given by needle, bleeding ceases when the placental site has been thoroughly curetted and the contents of the uterus have been removed. I use the drug daily for many days after curettage for abortion. I follow the same method after curetting the uterus for menorrhagia or metrorrhagia. An ampoule is given in one dose or divided doses every day for many days, sometimes for weeks or even for months. The effect in contracting the uterus and its action upon the ovaries is sometimes quite marked, in other cases quite slow. I have tried in several cases to follow a most thorough curettage by the persistent and continued administration of pituitary extract, with the idea of producing a permanent amenorrhea.

The hypodermatic use of pituitary extract is an excellent ambulatory treatment for menorrhagia or metrorrhagia in young girls, in whom examinations or treatment or curettage is out of the question. A hypodermatic injection may be given every day, if possible, for weeks and months. Only occasionally are the patients annoyed. They sometimes feel a little weak, there is a slight pallor, sometimes a little trembling of the extremities. Not infrequently a marked action of the intestine is noted, some patients finding that it has a rapid stimulating action on peristalsis. Occasionally it does contract the uterus so forcibly that it brings on the succeeding menstruation much earlier than was expected. Only rarely are such patients so sensitive to it that it must be given in small doses. I have had one case that was extremely sensitive so far as resulting contractions were concerned. This patient's family is of the hyperpituitary type. If pituitrin may not be given by needle, then the extract of the posterior lobe or of the whole gland may be given in powdered form.

To patients who are very sensitive to the drug, to those who cannot come for daily injections, I have given the extract of the whole gland in capsules for long periods. The result in this class of cases is encouraging. In passing, I may say that the whole gland is a splendid tonic in some cases of asthenia. When given for obesity it has had little effeet in my patients. As many of them suffer from amenorrhea, I do not consider the drug indicated without the addition of ovarian extract.

The greatest find as regards the physiological action of pituitary extract is to be noted in the field of parturition. Here we have a drug made from one of the internal secretory glands. Alone, it has no effect in inducing labor, but once labor is on the way, whether recognized or not, the action of this drug is most remarkable. It brings on uterine contractions, intensifying the contractile power of the uterus most remarkably. Using this drug in proper doses and at proper intervals, we may make any uterus do the amount of work that the best-behaving, normally-acting uterus does. It enables a primigravida to go through the three stages of labor within a period of seven to ten hours. Here we have the whole question: *proper doses, proper intervals, and proper indications.*

What is the dosage? I give a third of an ampoule every half-hour or so, according to the activity resulting, evidenced by the force of uterine contraction and the amount of progress that is observed. Three to five minims are given as the first dose in order to judge the effect.

The dose intervals average about a half-hour, often longer, rarely shorter. These short intervals as a rule represent that period in the second stage when chloroform is administered. The administration of chloroform has a tendency to inhibit or diminish the activity of the pituitary extract. Hence, if this be the case, it must be given at more frequent intervals than one half-hour.

Indications: When conditions are normal and the relation between the fetal head and the pelvic bones is normal, when the presentation is a normal one, when all we need is sufficient uterine force, then we may use pituitary extract. Let me repeat: *"When all we need is sufficient uterine force."* Hence, when in the first stage or in the second stage, labor is not progressing rapidly enough, and nothing is at fault except lack of force in the uterine contractions, then pituitary extract properly administered, gives to the uterus this desired amount of force. One need go no further than this, as a general statement. I have given in one primigravida whom I subjected to the "test of labor" successfully, thirteen ampoules in thirty hypodermatic injections, and delivered her safely and without instruments and without a tear. I was at her bedside for eighteen hours.

Pituitary extract helps us to make the diagnosis of labor. If anything in the patient's behavior, if anything in her symptoms, any medical sign, leads us to suspect that she may be in labor, or be going into labor, whether actual regular pains are present or not, three injections, each consisting of half an ampoule of pituitary extract, given at intervals of half an hour, will aid us in making the diagnosis.

If the patient is in labor, these three injections will produce regular, rhythmical, continued labor pains. If she is not in labor, small pains may be produced; these will cease and in half an hour or so will stop entirely and not recur. This is one of the greatest and most valuable aids that we have in pituitary extract. It is of wonderful diagnostic value in multiparae, and while of great value in primigravidae, it is not so important there, because the duration of the labor is longer and the fear of not reaching the patient at the right time is not so pressing.

A field in which pituitary extract finds an excellent opportunity for effectual action is the induction of labor. If a Barnes bag is introduced into the cervix, a few hours afterwards the patient experiences a sense of pressure and discomfort. If then, pituitary extract in small and repeated doses be administered, as a general rule labor pains of a rhythmical nature come on and labor progresses without any difficulty. No second or third bag has to be introduced. This is a marked improvement on our usual technic. My success in this procedure led me to think of the possible value of pituitary extract in inducing labor without the aid of a Barnes bag, for I found that in dry labor pituitary extract, if given shortly after the membranes rupture, saves hours and hours of waiting. In other words, it brings on rhythmical labor pains very soon. Ordinarily, when the membranes rupture, we have to wait from several hours to two or three days before labor pains come on. All this delay can be saved in the larger number of instances by the use of pituitary extract.

We must, however, consider this condition as probably due to an attempt at labor, unrecognized so far as pains are concerned. This is the more probable because pituitary extract, when given by needle in these cases, promptly starts the labor pains in a rhythmical manner.

It seemed to me that if any drug could be given which would have a tendency to bring on labor pains, or a tendency to cause the head to mold, or the cervix to become softened, or in a slight degree dilated, that following this the use of pituitary extract might help out. I tried in several cases the administration of castor oil, followed by quinine. This was followed after a few hours by three or four hypodermatic injections of pituitary extract. The next morning the same procedure was followed. Castor oil and then quinine was given. Two hours after the quinine, on the appearance of the slightest pain or discomfort, pituitary extract was given and repeated and continued.

So far I have but one failure, that being a case in which this method was tried two weeks before labor was due. I tried it again ten days later, and it was entirely successful. If, by this procedure, we are able to induce labor in appropriate cases at or about full term, without the use of the Barnes bags, much will have been gained.

My observation leads me to the belief that the nearer the date of the expected labor, the more likely is the procedure to be successful. In my own experience I should say that in over ninety per cent. of the cases in which this method is tried a few days before the expected date, success will be our reward.

In labor, the action of pituitary extract in primigravidae, if properly brought into force, diminishes the duration of one-half, so that the average duration of labor in a primigravida can be made between seven and ten hours. In multiparae the effect is more marvelous. The duration of labor, in these cases, after the administration of pituitary extract is from fifteen minutes to two and a half hours, rarely more than this.

I may say with certainty, that one may, after giving pituitary extract to a primigravida, leave his patient for a while, but one may never do this with a multigravida, for here labor (meaning by that, dilatation of the cervix, engagement of the head still bobbing above the brim, the passing through the vagina, and birth out beyond the perineum) may take place so quickly that, in the language of a physician friend of mine, who was guided by my advice in a certain case—"pituitrin simply shot the child out of the uterus." The dose here was only one-third of an ampoule.

Some patients have between pelvis and fetus such a relation that one is certain that labor will progress safely and steadily even though pituitrin may be needed. This can be satisfactorily accomplished only by the physician knowing definitely in every case just what pelvic conditions he has to contend with. This means that the patient should be examined every two weeks up to the last month, and during the last month once a week. One is surprised to find how often, before labor, the head is well molded and through the brim, how often it is well molded and fixed in the brim. To be fixed in the brim, in practically all cases, is a *sine qua non* in primigravidae.

In other cases there is such a mal-relation between the fetus and the pelvis, or the pelvic measurements are so below normal, that we know absolutely that no living child can be born per vaginam, and that a Cesarean section must be performed.

Then there is a large number of cases (I am speaking now principally of primigravidae), where one does not know until the last two or three weeks of pregnancy whether there is to be a simple, easy and safe labor or not. It is in this class of cases that Cesarean section should be considered, and the term "Cesarean section" and its meaning, should be explained to the family of the patient, when fixation is absent.

There are cases where the head is only moderately engaged and, in some instances, not engaged at all. These latter types are the ones to which I refer, for they will imply, often enough, if the baby is to be born by the natural passages, a long period of fixation, for molding and for passing through the brim into the pelvis itself. In some cases this will not happen. The patient will be in labor for hours, and there will be no fixation and no molding.

With the first form one is confronted with the alternative of high forceps, or a long-protracted labor with the use of pituitrin. In the second type of cases, one is confronted with the probability of a version, or some other procedure (symphysiotomy) if the patient be treated obstetrically from below. (I am referring now particularly to cases where pelvic measurements are normal, or only slightly subnormal.)

These are the classes of cases in which I believe Cesarean section should also be considered before labor, and in large number of which, I believe Cesarean section should be done sufficiently early. Cesarean section is a very safe procedure, if done when we want to do it and not when we are compelled to. If a patient passes hours in fruitless labor, attempt is often made to apply high forceps, generally against the cardinal rules. If, when called to such a case, we broach the subject of Cesarean section, the family is struck with the suddenness of the advice, additional consultations are required, family councils are held and generally the life of the child is sacrificed, and ofttimes the health and life of the woman is jeopardized.

Too much attention to pelvic measurements alone is paid by some, no attention is paid to them by others. Diminished measurements are always of significance, but normal external figures should not lull us into a sense of security, for the internal measurements may be altered, and a large head changes the relation and often makes all the difference in the world. Hence, attention to the element of fixation in the brim is of the greatest importance.

No patient should go into labor without the physician knowing exactly with what he is confronted. He should know, before labor begins, whether he is dealing with a vertex or a breech or a transverse presentation. He should know absolutely, in a primigravida, whether the head is fixed, molded and engaged in and through the brim. If he does not know this before labor begins, the moment he is called to the patient he should examine her and examination should inform him as to the conditions with which he is confronted.

No man should dare to give pituitrin, no matter in what small doses, unless he knows the presentation and the position. No man knows whether a prolonged first stage is a favorable thing, unless he knows the presentation and the position. No one knows whether a "test of labor" lasting several hours, is an advisable procedure unless he knows the presentation and the position. *Patients in labor must be examined.*

The education of the undergraduate, the training of the physician himself, and the education of the public should be directed towards a recognition of the fact that Cesarean section done at the physician's hour of selection, is one of the most salutary and life-saving procedures in all surgery. It insures a living child within two minutes after the first incision is made, if the child is alive before the operation is begun. It insures a convalescence without harm to the mother, in practically all clean cases where no careless examinations and injudicious attempts at instrumentation have been made.

Frequent examinations of the patient without the most painstaking asepsis, prejudice the patient's convalescence. The application of forceps with the head above the brim, in the largest number of instances, means that not sufficient care and not enough asepsis have been practised, for this special "test of labor" is not lightly attempted by expert hands.

If there is a choice between high forceps applicaton with a head slightly engaged, after a prolonged labor, with the probable resulting production of a cystocele and a rectocele and tearing of the perineum on the one hand, and a clean-cut timely-selected Cesarean section on the other, I fail to see how any intelligent physician can hesitate as to the choice. It is our duty to educate the public up to this fact. We are striving to educate the public and the doctors to the necessity of early diagnosis of carcinoma in different parts of the body. This can be done only if patients come to the physician early. Early carcinoma can be diagnosed only if the physician thinks of the possibility of carcinoma in every case.

More lives could be saved than are saved by this diagnostic care, more babies could be rescued, fewer injuries which mean subsequent operative procedure would be produced if Cesarean section were practised more frequently.

Cesarean section, of course, must be done when the patient's pelvis is absolutely too small, when fibroids or ovarian tumors, or tumors of the pelvic bone absolutely prevent the expulsion of a living baby, or when there is dystocia after previous operation.

A particularly interesting class of cases is that of pregnancy in a uterus containing one or more fibroids which in all probability will interfere with the engagement of the head and with its passage through the brim of the pelvis. No one can foretell, in the early stages of pregnancy, unless the cervix absolutely blocks the pelvis through the tumor contained in it, what these fibroids or myomata will do. They assume the most unusual positions during the latter months of pregnancy, often growing up out of the pelvis and beyond the point at which they may produce an obstruction.

In some cases labor may last one, two or even three days, and in the course of time the fibroids may pass up out of the pelvis and out of the position where they may obstruct the passage of the fetus. But the question is: Do we wish to risk the chance of such a favorable outcome? If it does not happen, we are forced to a Cesarean section.

I know that in the earlier years of my experience, such cases came to my attention and notice in hospital and in private work, where to-day the safety of Cesarean section would make them without question operative cases from the outset. I have had several such instances, cases which I have watched from the earliest period of pregnancy to full term, and I can only say that it is remarkable what changes may occur in the extent, the position, and the relation of these intramural and subperitoneal fibroids.

However, it is just in this class of cases that Cesarean section should be weighed carefully, as the advisable procedure, and in practically all instances should be accepted as the one and only indication. I have had cases where, had the patient come to me before pregnancy, I would have expressed the opinion that because of the large number of fibroid tumors, pregnancy was almost impossible. We ought to be reasonably delighted if such a patient really can conceive and carry to full term. Who knows whether a second pregnancy will ever take place, or whether it will be considered advisable?

Why not insure the birth of a live baby without any hesitation and without any fear by Cesarean section?

In transverse presentation, with membranes ruptured, and in prolapse of the cord, we have conditions where, to say the least, Cesarean section may give a living child, when other procedures will not.

Cesarean section is advised by many in eclampsia. With this idea I agree as a general proposition. It is represented as an advisable procedure in placenta previa centralis. I fail to see why it should not be used in all cases of placenta previa in which the child is viable and alive.

The argument has been made that by treating cases of placenta previa centralis, lateralis or marginalis from below, we may, and often do, lose the child, but we generally save the mother. Then the physician looks forward to a subsequent pregnancy with a normally situated placenta to give offspring to the parent. I say that the important question is the life of the child which is in utero, and not a prospective baby which may some day be there. If it is the first baby, this is absolutely true, for the patient may not become pregnant again, either voluntarily or otherwise, and we know that in spite of the greatest care, operative procedure or manipulation from below are followed by a slight inflammatory reaction which may affect the tubes and prevent subsequent pregnancy.

Some physicians are afraid of the scar on the uterus when the subsequent pregnancy takes place. I fail to see why an operation, if properly carried out, should leave a scar that will not stand the strain. Besides, if another Cesarean section be necessary, there is no reason why it should not be done a second, third or even a fourth time.

In the next place, the placenta previa lateralis or marginalis may occur in a multipara. Then why sacrifice the life of that child, why not save it, and make certain that the mother is safe? It takes only a short time to open the uterus, extract the child and remove the placenta. If this procedure is advisable in placenta previa centralis, it is certainly more easy and safe in placenta previa lateralis and marginalis.

But why should Cesarean section be used only in those cases where the indications are so absolute as these? Why not apply the principle of safety to those borderline cases where one wants to make sure of a living fetus and sure of the convalescence of the mother without injury to the soft tissues below? Here I say the physicians are at fault. They are at fault because they fear the suggestion of Cesarean section may terrify the mother and the family.

It is only by educating the public up to the safety of Cesarean section, it is only by showing them that it is not an operation of last resort, that it saves the baby within two minutes and in practically all of properly selected cases, saves the mother also, that we can bring them to the point where they will adopt the suggestion of the physician. Then we must attempt to educate the physician, whose mind is not fixed on Cesarean section, but who leans rather to the operative procedure from below, such as high forceps, version, etc. No physician who has been in practice for a sufficiently long time, can fail to look back without seeing a large number of cases in which version, with or without immediate extraction, was done, and many cases of high forceps and even of medium forceps, where the baby's life would have been saved by Cesarian section done at the proper time.

This is the key-note of the question—"*the proper time*." One does not have to wait until labor pains have continued for several hours, though one must do this if he is to give the patient the so-called "test of labor." Then, this so-called "test of labor" must be carried out in a hospital or properly conducted sanitarium, so that, after a fair trial has been given, the patient may be submitted to the operation at once. On the other hand, there is no reason why one has to wait for the "test of labor," no reason why one has to wait for labor pains, simply in order to obtain dilatation of the cervix. Cesarean section may be done without the faintest pain having depleted the patient's condition, or without there having been any dilatation of the cervix.

The operation should be done when one wishes it. It requires only a small incision, entirely above the umbilicus. The uterus is incised without any attempt being made to bring it out of the abdomen. Then the fetus is extracted and the placenta and membranes are removed. At the very moment that the incision into the abdominal wall is being made, one ccm. of pituitrin is given by needle. The action of this drug is exceedingly rapid, so rapid in fact, that after the incision into the uterus is made, there is (not infrequently) difficulty in extracting the fetus, because the uterus contracts so promptly.

After the extraction of the fetus, placenta and membranes, the uterus contracts so forcibly that there is absolutely no bleeding from the line of incision, and almost none from the uterine lining itself. Immediately then, a long continuous suture is taken through the depth of the wound just above the edge of the mucous membrane. It is passed from side to side exactly like the subcuticular suture of the skin. It is then tied firmly. This is accomplished within a minute or two and completely shuts off the uterine cavity from the wound surface. Then one takes his time to pass interrupted sutures through the entire thickness of the uterine wall and down near the mucosa. Other sutures are then passed between these and then the peritoneal sutures are passed. It is always advisable to place the omentum over the wound and then to close the abdominal incision.

The convalescence is smooth and uninterrupted. A procedure which I have followed in recent years is to continue the use of pituitrin during the first week or ten days. It is given in one-third ampoule doses every three or four hours. It keeps the uterus properly contracted and aids the muscular power of the intestine. Without pituitrin, or with it, ergotole also should be given. Ergotole alone may be used to keep the uterus more or less contracted and allow a more rapid healing of the uterine incision. Pituitrin helps because it stimulates the breasts.

I do not wish to give the impression that I look upon the operation of Cesarean section so lightly as to advise it indiscriminately or freely. I have had much experience with this operation, especially in private practice, and have many, many times spoken to the husband or to other members of the family about the condition, and have mentioned the fact that a Cesarean section might be found advisable, or asked for the authority to use my own judgment at the proper time, and more than once have refused to figure in the case unless such advice was to be followed if I insisted upon it. Yet, strange to say, time and again, as the hour approaches when the Cesarean section becomes the correct procedure to be advised, the patient will hesitate, the husband hesitates, the family hesitates, and one must proceed quickly and with determination.

Those who have not experienced this, can picture what difficulties would confront a physician who gives this advice without previous preparation of the family, without previous explanation for its reason. Such people are practically struck dumb, they imagine it is an operation of last resort, that the patient is in jeopardy, and that only a miracle can pull the mother through and no miracle can pull the child through at all. This is the popular belief.

I wish to refer to a point in the education of undergraduate students, a point which every practising physician should also bear in mind continuously. We are too apt to concentrate our thoughts on the fact that the first stage implies the dilatation of the cervix. Practically all text-books say: "The first stage begins with the first labor pains and continues until the cervix is dilated to the diameter of four or five fingers, or until the cervix opening is as large as the palm of the hand."

Very little is said of the fact that with this dilatation of the cervix there should be going on, hand in hand, a molding of the head, a fixation of the head through the brim of the pelvis, a gradual passage of the head into the pelvis. If the first stage is thought of in this way, one logically comes rapidly to a decision when treatment is necessary. For instance: After several hours of labor in the first stage, one examines and finds that the head is well molded and has passed through the brim of the pelvis and yet the cervix is not dilated. He may now, with perfect confidence, give slight doses of pituitary extract, repeated at intervals of a half-hour, in order to procure dilatation of the cervix.

On the other hand if, after several hours of labor in the first stage, a physician finds the cervix completely dilated in a primigravida, but the head not molded and passed through the brim, or molding very slowly, and not fixed in the brim, then the only possible excuse for the administration of pituitrin in most carefully selected small doses is to give an additional "test of labor."

Failure of engagement, of fixation and of molding, after a proper interval, is to be followed, according to my advice and opinion, by a Cesarean section. Hence it is much more important to fix our thoughts on the fact that the first stage means molding and passing through the brim, than on the simple fact of dilatation of the cervix alone.

When measurements have shown the pelvic diameters to be below the normal, when with such conditions in the pelvis, or even with a normal pelvis, examination in the latter weeks show a disproportion between head and pelvic inlet, induction of labor must be considered. This procedure is much more simple now than formerly. Instead of having to introduce a bag and then after hours, a second or even a third, I now introduce one bag, and after waiting a few hours, begin with the pituitary extract by needle. The result is extremely gratifying and time-saving.

This procedure stands then as a rival to Cesarean section done at full term or earlier. No one can deny the immense value of this procedure. The use of the bag followed by pituitary extract is also of value in placenta previa, albuminuria and in threatened eclampsia. Here we must weigh in every case the matter of time. If the saving of time is of importance, Cesarean section is the operation for it. If the desire to obtain a full-term child is of importance, here again, in many cases, Cesarean section is the operation employed. If in placenta previa the patient is in a sanitarium or a hospital, closely observed and watched, and if there is a desire to carry the case on until the child is certainly viable, then again Cesarean section is the operation employed.

In these and other indications, to obtain a live child is the important consideration, which leads us to favor Cesarean section as against the other slower and possibly more conservative procedure. It is not to be felt that the other procedures will not give a living child. They do it in the largest number of cases, when applied in the proper way and at the proper time. But certainty, certainty of a living child, assurance of a living mother, are things which cannot be foretold. There is a vast difference between deciding these questions before birth and looking back upon such a case which has ended either favorably or unfavorably after birth by the natural paths.

Pituitrin can do very, very much even in difficult cases. If the head engages, if it molds, even very slowly, if it passes gradually through the brim, we can with patience and repeated injections of pituitary extract, with or without intervals of rest, guided by the condition of the patient and by the fetal heart, carry the most difficult cases to a successful termination without the use of forceps. But even in such carefully watched and followed cases, there must be occasionally an instance where the procedure is too much for the child and we lose it. The same result confronts us if pituitrin is not used, if forceps are applied at what may be considered a favorable time, or at a time when all the cardinal rules are observed. In my practice I have absolutely excluded the use of forceps. Only a sudden emergency, demanding the greatest rapidity, can influence me to apply them. I feel from the experience I have had, that I can do with pituitrin, even if more slowly, all that the forceps have ever accomplished, and can do it just as faithfully and with equal certainty as to the life of the baby, and surely with greater assurance as to the conservation of the soft parts and of the perineum.

In my private practice I have not applied forceps in a period of over two years. When I recall the large number of cases with the head in the midplane and almost on the perineum, where pains ceased, hours passed without any progress unless forceps were used, and I now contrast with this, the ability in all cases to end the labor with the use of pituitary extract, and to add chloroform when the head is coming over the perineum, I realize that I have adopted for my own advantage a procedure of the greatest safety and one which gives, in the last three-quarters of an hour, a genuine, harmless, progressive "twilight sleep" of the sort that should obtain universal recognition.

134 West 87th Street.

Deep Roentgentherapy in Breast Carcinoma. Surgeons in general are gradually learning to recognize the value of deep Roentgentherapy in the post-operative treatment of carcinoma of the breast, but very few have yet learned the value of using it in all cases. Many surgeons (Rodman as an example), only use this treatment in more or less advanced cases, in which there is axillary or supraclavicular involvement or in which the mediastinum is suspected of involvement. The fact that recurrences and metastases can be made to disappear leads surgeons often to operate on patients that would, under ordinary circumstances, be considered inoperable and hopeless. Most of these at least I believe have their lives prolonged, providing thorough post-operative deep Roentgentherapy is given.—George E. Pfahler *in The Journal of Advanced Therapeutics.*

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, APRIL, 1916.

THE MEDICAL DEPARTMENT AND THE INCREASED ARMY.

At present there are 444 medical officers, all told, in the United States Army of approximately 90,000 men. This is a proportion of less than five per thousand—a proportion scarcely equal to the manifold activities of the medical department in times of peace and quite inadequate to meet the immediate demands, in case of war, of a call for more troops. Experts consider seven medical officers per thousand men the safe minimum of efficiency; and Surgeon General Gorgas has requested that in the army reorganization the medical department be raised to and maintained at that percentage.

The army bill of Mr. Chamberlain, chairman of the Senate Military Committee, provides a proportion of medical officers of approximately 5.1 per thousand—an insignificant increase. The army bill of Mr. Hay, chairman of the House Committee on Military Affairs, appears to provide for an actual relative decrease in the number of medical officers, namely, to about 4.6 per thousand.

The glorious accomplishments, in peace, of the medical department of the United States Army—in medical research and in sanitation—are known the world over. The demands upon that branch of the service are increasing in volume and complexity. Not to increase or actually to reduce the relative size of that department will hamper its further possibilities. If war breaks out the small number of officers available for the immediate needs of recruiting will be quite unequal to the task. It was because of the lack of efficient medical recruiting officers in the Spanish-American War that our pension list is being increasingly burdened by thousands who were unfit for service. Bitter, too, and justifiably so, were the criticisms then of the inadequacy and unpreparedness of the medical department and the inefficiency of the volunteer medical corps.

The Hay bill also provides that the present Medical Reserve Corps shall be abolished after one year; and that medical officers, graded in rank, shall be admitted to an "officers' reserve corps," all such officers to be commissioned for five years. Whether or not this would be any less desirable, from the standpoint of efficiency, than the present organization of medical reserve officers, commissioned indefinitely as first lieutenants, we are not prepared to say. On the face of it, there appears no valid reason why medical reserve officers should be organized separately from and differently than reserve officers in the line, and no reason to fear that medical officers in such a reserve would lose the interest and control of the surgeon general. Nevertheless, under its present organization, the Medical Reserve Corps of the Army has responded loyally—for the most part—to the opportunities afforded it for instruction in camps and by correspondence course, and the active associations in New York, Chicago and St. Louis are further evidence of its spirit and interest.

THE STANDARDIZATION OF FIRST-AID METHODS.

At the call of a number of chief surgeons of railroads, there met in Washington last August a First Aid Conference composed of representatives of the Medical Departments of the Army, Navy and Public Health Service, of the American Red Cross, chief surgeons of a number of railroads of the United States, civil surgeons representing national surgical associations, general officials representing the railroads, and representatives of manufacturers of first-aid supplies.

As reported by Bloodgood in *The Military Surgeon*, January, 1916, this conference considered:

> Uniformity in methods; standardization of material; fixed, uniform rules for all under ordinary circumstancse, without interfering with the surgeon's liberty of action as far as initiative towards better methods is concerned.
>
> * * * * *
>
> Whether it was a good plan for railroads, manufacturers, mines, and other employers of labor to furnish first-aid packages, fixation dressings and stretchers for transportation at convenient places, quickly available in time of accident.
>
> The character of the first-aid package: its size, what it should contain, and whether the size and character of

> the different bandages and gauze pads should vary for different kinds of wounds and for varying environment. That is, would a single first-aid package meet all the requirements?
>
> Whether any disinfectant (and if so, what kind) should be placed in the first-aid package to be used by the individual or some nearby helper.
>
> Whether these packages should be issued to the individual laborer as they are to the soldier, or whether the packages should be kept in boxes in readily accessible places.
>
> Whether there should be placed a first-aid package containing special dressings for larger wounds and burns, and some liquid or solid ointment for the immediate protection of such wounds.
>
> How much should the individual laborer be told about first aid, and the best method of instruction.
>
> This purely first-aid problem and the question of an antiseptic received the larger consideration.
>
> The problem of fixation dressings for fractures, that is, the character of the splint and how it should be arranged for first aid, was given less attention.
>
> * * * The question of a uniform stretcher * * * was emphasized in the addresses of Drs. Harvey Cushing and George W. Crile.

It was brought out in the discussions that

> Many railroads in the United States furnish no first-aid material, but some of these provide stretchers at convenient places along the line. Their men receive no instruction on first aid. When a man is injured, the orders are to get hold of the nearest doctor, or have someone take the injured to the nearest railroad surgeon. Everything, therefore, is left to the surgeon.
>
> Other railroads, working apparently under the same conditions, have adopted and have maintained for a number of years a scheme of first aid as complete as in the army. Not only are materials supplied, but the men are instructed how to use them.
>
> It seemed to be the consensus of opinion that railroads, mines and other employers of labor should furnish first-aid material, and give first-aid instruction under the supervision of their surgical department to their employes.
>
> Those who have adopted such a system are of the opinion that the results are better and the period of disability shorter, and for these reasons it is a distinctly economic gain; without much doubt it is very humane from the standpoint of furnishing the best possible immediate treatment in cases of accident.

The opinion was uniform that first-aid methods should be introduced in all railroad systems, mines, manufactures, etc.; but it was also evident that there must first be determined a standard of instruction in first aid and of first-aid materials.

It was therefore determined to request President Wilson to appoint a Board of First Aid Standardization. This board has been selected by the president and consists of Colonel Louis A. La Garde, United States Army, retired; Major Robert U. Patterson, of the Red Cross; Surgeon A. M. Fauntleroy, U. S. Navy; Assistant Surgeon General W. C. Rucker, U. S. Public Health Service; Dr. A. Shelton Horsley, of Richmond, Va., representing the American Medical Association; Dr. S. C. Plummer, of Chicago, representing the American Association of Railway Surgeons, and Dr. Richard A. Harte, of Philadelphia, representing the American Surgical Association.

This commission will investigate first-aid methods, packages, the standardization of first-aid equipment and an identical course of instruction to be followed throughout the country, and will report on these subjects to the American First Aid Conference, of which Surgeon General Gorgas is president.

To further stimulate general attention to this important subject, the national surgical associations and the state medical societies have been requested to appoint first aid committees.

The First Aid Conference has thus taken a long step forward in a matter of grave importance and vital interest. In this country—indeed in all countries—the loss of life and limb in industrial, railroad, mine and shipboard accident is far too large. General instruction to workingmen in the principles and practice of first aid, and standardization of first-aid methods among railroad, mine and factory surgeons, will go far to diminish this great loss. They will, too, act beneficently by encouraging caution and mutual helpfulness.

With this must go hand in hand unceasing efforts in accident prevention by the further development of safety devices and the elimination, as far as possible, of human errors.

THE PILCHER SEMI-CENTENNIAL.

Fifty years have passed since Lewis Stephen Pilcher, distinguished surgeon, scholar, student of medical history and editor of *Annals of Surgery*, entered the practice of medicine. Fittingly to celebrate this semi-centennial of notable activities, a committee of Dr. Pilcher's many admirers have arranged for a series of open clinics to be held in all the Brooklyn hospitals on May 11th, 12th and 13th, and a banquet in Dr. Pilcher's honor on the 12th.

The long list of distinguished medical and laymen, American and foreign, that ornament the committee testifies to the esteem in which Dr. Pilcher is held. The Journal joins with them in felicitations and affectionate tribute. Long may Dr. Pilcher live to grace American surgery and surgical journalism!

WILLIAM L. RODMAN.

Sad, indeed, is the recent death, from pneumonia, of Dr. Wm. L. Rodman, in the zenith of his career and during his incumbency of the high office of president of the American Medical Association.

In the medical affairs of this country Dr. Rodman was a man of importance no less than of professional distinction. For years he had labored, and successfully, in the effort to raise the standard of American medical education; and his activities in this direction, both in committees of the American Medical Association and otherwise, stamp him as a man of force and of ideals. His labors to establish a voluntary national licensing board were also successful. The importance of this is evident; may it soon lead to a rational system of national licensure. He was active in the American Society for the Control of Cancer, and much of his professional and public work was in this field. He had been much interested in the reorganization of the medical department of the army, in which he had served from 1880 to 1882. At the time of his death he was agitating medical military preparedness, for which his experience of many years in the Committee on National Legislation of the A. M. A. had made him an able spokesman.

THE LATE DR. WILLIAM L. RODMAN.

As a surgeon Dr. Rodman was equally distinguished. After serving as Professor of Surgery in the University of Louisville for five years, he removed to Philadelphia in 1898 to accept the chair of surgery in the Medico-Chirurgical College, which he occupied until his death. Since 1900 he was also professor of surgery at the Woman's Medical College of Pennsylvania. During these years he made many contributions to surgery and became one of the most prominent of American surgeons. Most conspicuous in his work are his clinical studies of breast tumors and, especially, his insistence upon the removal of the ulcer-bearing area in operations for gastric ulcer.

The presidency of the American Medical Association falls to Dr. Albert Vander Veer, of Albany, like Dr. Rodman, a prominent surgeon and well fitted to occupy this office.

TWO NEW RESEARCH JOURNALS.

Two new journals have recently appeared, each devoted to an important field of medical research.

The Journal of Cancer Research is a quarterly, edited by Dr. Richard Weil, of Cornell University Medical School. Its first number, dated January, 1916, contains the following: Further Investigations on the Origin of Tumors in Mice (The Part Played by Internal Secretions in the Spontaneous Development of Tumors), by A. E. C. Lathrop and Leo Loeb; The Mortality from Cancer in the Western Hemisphere, by Frederick L. Hoffman, LL.D.; The Effect of Phloridzin on Tumors in Animals, by F. C. Wood and E. H. McLean; Pathological Aspects of Some Problems of Experimental Cancer Research, by James Ewing; Transplantable Sarcomata of the Rat Liver Arising in the Walls of Parasitic Cysts, by G. L. Rohdenburg and F. D. Bullock; Chemotherapeutic Experiments on Rat Tumors, by Richard Weil; Proceedings of the American Association for Cancer Research.

The Journal of Immunology is a bi-monthly, edited by Arthur F. Coca, also of Cornell University. The first number, February, 1916, contains three Studies in Anaphylaxis by Richard Weil; two articles on Complement Fixation in Varicella, Vaccinia and Variola, by John A. Kolmer; The Fate of Various Antibodies in the Precipitin Reaction, by Frederick P. Gay and Ruth L. Stone; Kidney Lesions in Chronic Anaphylaxis, by T. Harris Boughton; The Destruction of Pneumococci Following Intraperitoneal Injection, by F. Berry and C. O. Melick; and the Proceedings of the Society for Serology and Hematology.

"THE PROCTOLOGIST AND GASTRO-ENTEROLOGIST."

The American Journal of Gastro-Enterology has combined with *The Proctologist* and is now published as *The Proctologist and Gastroenterologist*, from St. Louis. Dr. Lewis Brinton, Philadelphia, and Dr. Anthony Bassler, New York, have editorial charge of Gastroenterology; Dr. A. L. Benedict, Buffalo, is editor of Dietetics; Dr. Rollin H. Barnes, St. Louis, is managing editor and publisher.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

WORKMEN'S COMPENSATION.

American experience with workmen's compensation acts is sufficiently limited to warrant constant inquiry into the practical results of such laws now established. The second annual report of the Industrial Accident Board of Massachusetts presents the results of a study of over 96,000 non-fatal injuries and over 500 fatal injuries reported during the year ending June 30, 1914. Eighty-seven per cent. of the non-fatal cases were insured, while 72.8 per cent. of the fatal cases came within the provisions of the act.

The social loss from physical disability is manifest by the aggregate loss of 190,795 weeks representing a total wage loss of $3,172,440. Eliminating those persons whose incapacity did not extend over 24 hours, the per capita number of days lost was 24.26. Without any system of compensation this entire wage loss would have been borne by the employees, while the industrial efficiency of the employers would have been decreased through the greater incapacity of workmen as a result of a lack of prompt and adequate medical service. Inasmuch as medical service only is provided for the first two weeks, 42,798 employees had the advantages of such attendance. The total compensation paid all injured employees and dependents of all fatally injured employees directly amounted to $882,162. The expenditures covering medical and hospital services and medicines totaled $446,171. In addition to these two items, liabilities were incurred for services rendered but still unpaid and for compensations representing deferred payments for losses incurred amounting to $1,283,419.

The dependents of those employees who met with fatal injury secured protection by financial compensation amounting to $69,577, while the deferred payments will bring the total of estimated liability for fatal cases to $578,705. These large sums of money were secured by a rational compensation provision and served to protect families of employees from further disabilities consequent to deprivation of wages. The social benefits are obvious.

Of the non-fatal accidents, 32 per cent. were due to hand labor and only 25 per cent. were caused by machinery. Machinery caused 17 per cent. of the fatal accidents, while hand labor was responsible for 5 per cent. With the exception of only a small per cent., the victims of these industrial accidents, fatal or non-fatal, were male. The largest number of persons affected were in the income group between 11 and 12 dollars a week. The largest number of these fatally injured were between the ages of 40 and 49 years, while those of non-fatally injured 37 per cent. were in the age group 21 to 29 years.

The cost for providing compensation as far as the employers were concerned represented on the average approximately 1 per cent. of the payroll, but inasmuch as it was intended that this cost be shifted to the consumer, the cost of such insurance to the consumer of manufactured products would amount to only 18 cents per hundred dollars value. It is patent that the social distribution of this compensation liability is almost negligible, amounting as it does to $.0018 per dollar purchase.

The experience of the Massachusetts Board during the past two years has prompted it to suggest some changes in the compensation law. Among those of particular importance is one which provides that the law be changed so as to provide for a waiting period of 10 days instead of 2 weeks in all cases in which the incapacity does not exceed 28 days. In all other cases where the period of incapacity exceeds 28 days, compensation should date back to the actual day of injury. It is certainly very desirable that the maximum compensation be allotted to the injured employee, who certainly is entitled to full compensation for the entire period of disability if he is entitled to compensation for any part of it. The original intent of a waiting period was to provide against malingering, but practical experience has indicated that this is a negligible factor. Malingerers are not numerous when individuals on a low income basis can scarcely afford to sacrifice their wages while the compensation returns would not total more than half of the losses thus fraudulently incurred.

The large amounts of money expended for medical and hospital service indicate that compensation acts not alone distribute the economic loss but create a more independent status for the employee and result in more adequate medical and surgical attention, either at home or in the hospital. From the standpoint of medical economics, it is noteworthy that the physician and surgeon is actually paid for services given and his responsibility for careful attention to the victims of industrial accidents is enhanced.

There is every reason for the medical profession to stand back of and support social legislation of this character. If the appeals must be made to the pocketbooks, it cannot be gainsaid that the medical profession is a distinct gainer through the enactment of compensation acts or health insurance laws. If the appeal is made to the social conscience of the profession, it is undeniable that the social and economic results to society not merely warrant the establishment of workmen's compensation acts but demand them as acts of social justice designed to protect and benefit the large industrial population forming the bulwark of society.

Bone Surgery.

There is no branch of surgery in which nature is more exacting than in bone work. To be successful in this field, the cases must be carefully selected, the most rigid asepsis should be observed, the surgeon must possess a good working knowledge of anatomy and fully appreciate the laws of stress, strain and leverage.—M. E. Preston, in *Colorado Medicine*.

Book Reviews

The Aftermath of Battle. With the Red Cross in France. By EDWARD D. TOLAND. With a Preface by OWEN WISTER, New York. THE MACMILLAN COMPANY, 1916.

The writer presents us with a series of pen pictures so vivid, so convincing, and yet so pathetic, that the little book is bound to make a strong appeal both to the medical profession and to the laity. With an enthusiasm born of true sympathy for his fellows, he takes us through the wards of the badly organized, inadequately equipped hospital, where surgeons and nurses fight their battle with suffering, incapacity, and death, and shows us "Jock," "the finest sprinter of his regiment," a helpless cripple for life, another specimen of young manhood reduced to hopeless imbecility, babbling the nursery rhymes of childhood, and still another, 25 years old, who with two broken legs, had crawled through the woods for five days before help came, and who is now in such a condition of sepsis that it is hard to see how he can live. Sepsis, gangrene, tetanus stalk through the wards, with Death too often following at their heels. Such is the "Aftermath of Battle."

Post-mortem Examinations. By WILLIAM S. WADSWORTH, M.D., Coroner's Physician to Philadelphia. Octavo; 598 pages; 304 original illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1915.

This is one of the most curious books we have ever been called upon to review. At first glance, the book is prepossessing; it is well printed, of a respectable size, and the illustrations are attractive. Our interest was further aroused by the preface, in which the author claims that he wrote the book upon an experience of 4,000 autopsies, so that, we presumed, he could speak with authority. It did not take us long, however, to discover that the work fails dismally in every expectation. The text is different from that of any treatise upon pathology that has ever been written. Indeed, we find very little pathology at all, and what there is of this subject is, to speak charitably, crude. The most part of the text is devoted to vague, aimless statements of possibilities. It is not often that we can pin the author down to a definite statement of fact, and when he is not writing in this manner, he is perpetually criticizing. There is hardly a page that does not contain one or more criticisms against the medical profession. It is therefore no surprise to find the ego in this work unusually dominant. The book is hopeless from every point of view.

Medical Lectures and Aphorisms. By SAMUEL GEE, M.D., F.R.C.S., Honorary Physician to H. R. H., the Prince of Wales, and Consulting Physician to St. Bartholomew's Hospital. With Recollections by J. WICKHAM LEGG. Duodecimo; 408 pages. London: HODDER AND HOUGHTON, 1915.

This book is a sort of pot-pourri of medical lore. The lectures cover a wide variety of topics upon internal medicine, and the text is simply a running commentary, as though given at a lecture. The value of the book consists in the teachings of a keen and practical clinician. Moreover, the text has real charm.

Beauty a Duty. The Art of Keeping Young. By SUSANNA COCROFT, author of "What to Eat and When," etc., etc. Octavo; 384 pages; illustrated. Chicago and New York: RAND, MCNALLY & COMPANY, 1916. Price, $2.00, net.

Now that the "other worldliness" of fanaticism is eliminated as a factor in the solution of life's problem, we find ourselves striving for that poise, the harmony between the inner and outer self, which was the ideal of the beauty-loving Greek. Miss Cocroft's book is rich in suggestions for the attainment of that ideal. The beauty which Miss Cocroft would have us strive for cannot be acquired by any artificial means, but must come as a result of the scientific care of the body. No fault or imperfection must be neglected for even a short period. Surgeon, doctor, dentist, must each contribute in the elimination of pain, waste of energy, and tension, so destructive to watchful care of each part of the body. Miss Cocroft further enjoins upon us the importance of right thoughts and feelings as a factor in beauty and poise.

Miss Cocroft's work is well known, but this book will be helpful to thousands who may not be fortunate enough to enjoy her personal ministration.

Anatomia de los Conductos Biliares y de la Arteria Cistica. DR. PEDRO BELOU, Profesor Titular de Anatomia Descriptiva de la Facultad de Ciencias Medicas de Buenos Aires. Paper Octavo; 302 pages; 102 illustrations; and 22 plates. Buenos Aires: IMP. "OCEANA"—Calle, Chili 525, 1915.

This valuable monograph represents a painstaking anatomical study. All abdominal surgeons may very profitably study the many excellent drawings and beautiful colored plates showing the variations and anomalies of the biliray ducts and the cystic artery—even if they do not read the Spanish text.

Progress in Surgery

A Résumé of Recent Literature.

Gall Bladder Diseases. C. H. MAYO, Rochester, Minn. *New York Medical Journal*, March 4, 1916.

Cholecystitis is an effective disease of the gallbladder. The bacteria are in the tissues of the gallbladder.

Infection may be mild, acute, chronic, or recurring.

Gallstones may occur in mild infections.

Cholecystitis or cholecystectomy without stones or local evidence of infection will not improve the symptoms for which the operation was made.

Gallstones may cause mechanical obstruction.

Cholecystostomy (with removal of stones, if present) gives high percentage of cure only if the infection has subsided or has been maintained by stones.

Cholecystectomy with or without stones in diseased gallbladders or existing cholecystitis gives a high percentage of cure.

Reflex gastric symptoms are caused by the infection.

The infection may through local peritonitis cause adhesions to bowels or stomach or of the liver to the abdominal wall.

Symptoms of mild gastric trouble may be nearly constant, increase with exacerbation of infection and subsidence of attack, much like those of ulcer.

The etiology may be a small local focus primary in the mouth or secondary in the appendix.

Typhoid bacteriemia may be the etiological factor.

Ulcers New and Old: Jejunal for Duodenal Ulcers. SIR J. BLAND-SUTTON. *British Medical Journal*, February 19, 1916.

Since the treatment of duodenal ulceration passed into the province of surgery it has become the routine practice to perform gastro-jejunostomy for its relief, in the hope that, by diverting the chyme through the new stoma into the jejunum, the ulcer will heal. If the pylorus is obstructed by the ulcer the results are usually good, because the chyme must flow through the new stoma, but when the pylorus is patent the chyme flows through it, and in some instances ignores the new route. This is not imagination, for the efflux can be watched with the help of an opaque meal and x-rays. I believe it is better, whenever practicable, to excise the pylorus with the ulcerated portion of the duodenum and rejoin the stomach and duodenum on the principle of an end-to-end anastomosis. If this method could be made safe, gastro-jejunostomy for the relief of chronic duodenal ulcer with an *unobstructed* pylorus would soon be abandoned.

Experience proves that posterior gastro-jejunostomy with an *obstructed* pylorus is a beneficent operation, in spite of the risk the patient runs of getting a new ulcer for an old one. The new ulcer has been evolved during this generation by alterations in the environment of the jejunum brought about by surgery.

An Unusual Case of Mesenteric Transplantation. V. Castro, Costa Rica. *Journal of the American Medical Association*, March 4, 1916.

Castro reports a case of omental defect after an operation for appendicitis in which the appendix was imbedded in omental and intestinal adhesions, and there were adhesions elsewhere and signs of chronic inflammation. There was also a Meckel's diverticulum with evident signs of chronic inflammation of its terminal portion, about three times as large as the normal appendix, which it was thought necessary also to remove. From the whole operation the intestinal lumen was decidedly diminished so that obstruction was feared. To cover the stump and raw surfaces left after the operation, a piece of mesentery between two veins as large as a silver half-dollar was dissected out and transplanted so as to cover the denuded area of the bowel. The operation was a complete success. Castro emphasizes the fact that this method of covering the raw surface was quite different from the two usual methods; namely, the suture of omentum to raw surface and torsion of the gut on its long axis with suture to an attached flap of the mesentery. Both methods, it seemed to him, would be liable to aggravate the condition already existing in this case.

Linitis Plastica. Joseph Sailer, Philadelphia. *American Journal of the Medical Sciences*, March, 1916.

"Linitis plastica is a condition in which the wall of the stomach becomes greatly thickened, loses its motility, suffers a marked diminution in its functional activity and as a result leads to death by starvation." The condition is rare. In the majority of instances, it is the result of a diffuse infiltration of the stomach coats by carcinoma. In rare instances, the condition is the result of syphilis, ulcer or a diffuse serositis. In many cases no underlying lesion can be discovered. The diagnosis is made either by (1) the clinical history and signs; (2) by *x*-ray; (3) exploratory laporatomy. As a rule, the clinical phenomena are not very precise The diagnosis, however, may be surmised: if the history is gradual; if there is evidence of decreasing capacity of the stomach; if there is fulness and perhaps a firm, round mass in the epigastrium. The *x*-ray picture is usually characteristic and serves to clinch the diagnosis. The treatment is purely surgical. Sailer reports an interesting case in a physician, in which the condition was due to carcinoma.

What Goiters Demand Operation? Frank H. Lahey *Boston Medical and Surgical Journal*, February 24, 1916.

The thyroid gland is subject to the following changes, from a clinical point of view:

Thyroiditis;

Enlargement (symmetrical or asymmetrical) without toxic symptoms (simple goiter, colloid goiter);

Enlargement (symmetrical or asymmetrical) with symptoms of hyperthyroidism (hyperthyroidism or exophalmic goiter);

Cysts;

Adenomata;

Carcinoma and sarcomata.

Thyroiditis occurs chiefly in the presence of infections elsewhere in the body. In three cases, abscess formation occurred but once, and in that case it was impossible at the time of incision to be certain that the pus was not outside of the thyroid gland. Surgical treatment will rarely be necessary here, and when so, only in the form of incision and drainage.

Symmetrical enlargement without toxic symptoms usually occurs in young girls soon after the establishment of the menses. The enlargement may be somewhat greater in one lobe than the other, and the gland upon palpation is fairly firm. Provided there are no symptoms of hyperthyroidism, this type of goiter in no way demands surgery, but should be submitted to medical treatment, and a careful watch kept for the onset of symptoms of hyperthyroidism, when an operation should be advised.

Colloid degeneration may also produce enlargement of the thyroid, which is more or less symmetrical, although one lobe is frequently enlarged more than its neighbor. The gland in this case is usually soft on palpation. The condition is the result of a retention of some of the elements of the thyroid secretion. This type of goiter may be submitted to surgical treatment because of its unsightly appearance, because of pressure symptoms, or because it has persisted for a long time.

Enlargement involving the whole gland, or, what is more common, the whole gland, but more particularly the right lobe, *with symptoms of hyperthyroidism*, are best submitted to surgical treatment in the form of ligation or partial thyroidectomy as early as possible. The so-called cardinal symptoms of hyperthyroidism need not be and frequently are not all present. The presence of two of these symptoms with or without some of the secondary symptoms, such as nervousness, diarrhea, sweating, etc., should suggest strongly the existence of this disease and even the presence of an unexplained tachycardia should be looked upon with suspicion.

Cysts of the thyroid, when of sufficient size to be noticeable, are usually single, and should be submitted to surgical operation because of their unsightly appearance, because of pressure, because they are intrathoracic, or may become so. A very large intrathoracic cyst or adenoma may be present while there appears but a slight enlargement in the region of the thyroid gland, represented by the top of the cyst as it appears above the clavicle or sternal notch. These intrathoracic goiters may exist with but occasional interferences with respiration or circulation.

Adenomata of the thyroid may be single or multiple, and, like cysts, should be submitted to surgical operation for the same reasons and because they may at any time become malignant.

With cysts and adenomata symptoms of hyperthyroidism as a result of pressure may arise at any time and operation then be indicated.

Carcinoma and sarcoma of the thyroid gland, to be benefited to any extent by surgical measures, more than in almost any other part of the body, must be submitted to early surgical treatment, and then even under the most favorable conditions the prospect of early recurrence is great. This constitutes an argument in itself to remove all suspicious localized swellings of the thyroid gland.

Goiter: An Analysis of 137 Cases. Charles N Dowd, New York. *Journal of the American Medical Association*, February 12, 1916.

From an analysis of 137 cases of goiter treated at the Roosevelt Hospital, Dowd deduces that for nontoxic patients suffering from pressure symptoms or neck deformity, cyst enucleation or partial thyroidectomy is very satisfactory in relieving symptoms and preventing the likelihood of later toxicity. For mildly toxic patients operation is also very satisfactory, and when the toxic symptoms develop in connection with pre-existing goiter, cure is almost certain. When they develop in the early stages of the growth, cure is usually obtained but cannot be so confidently predicted. The operation may be partial thyroidectomy, cyst enucleation, artery ligation or boiling water injection, according to the case. Advanced exophthalmic goiter presents the most difficult problems. Many elements must be considered, including the complex nature of the ductless glands, their interrelations and chemical influences from other parts of the body and the various therapeutic measures which interrupt this vicious chain of disturbance. The hyperplastic thyroid seems to cause many of the symptoms and is the organ most easily attacked. The treatment consists largely in the endeavor to control its overactivity. Rest is an important element. Boiling water injections have an undoubted influence, and can be used for patients too ill for other measures. The ligation of the thyroid arteries is also beneficial and can be used as an adjuvant measure or substitute for thyroidectomy. Partial excision of the glands must be considered a most reliable therapeutic measure, but the administration of drugs and the animal extracts may be beneficial. A choice of method should depend on the condition of the patient and if rightly made nearly all the patients can be improved.

Concerning Shot-Wounds of the Skull. *Zur Frage der Schädelschüsse.* Alfred Kirchenberger, Commander of the Field Hospital. *Münchener Medizinische Wochenschrift*, January 25, 1916.

Publications on the question of skull shot-wounds are usually concerned with when to operate and when not to operate. The author desires to emphasize several points regarding *how to operate* in these cases. In general avoid all unnecessary trauma. Thus local anesthesia is to be preferred in every case. One of the cocain preparations with the combination of adrenalin obviates the necessity of putting hemostatic sutures. Scopolamin, otherwise recommendable, should not be used because it increases blood pressure. In tangential shot-wounds it is only necessary to prolong the wounds slightly; in penetrating wounds the incision should connect the point of entry and exit. Extensive osteoplastic flaps are never necessary in the opinion of the author; nor is it necessary to separate an extensive surface of the periosteum in case underlying bone need be removed. The object of this simplified technic is to save unnecessary shock, unnecessary chances of bone necrosis, prolonged operation, many assistants. The operation at Kirchenberger's hands lasts 10 to 15 minutes and he is assisted by an orderly who steadies the patient's head, protected by sterile pads.

The second point to be emphasized is concerning transportation. This the author insists should be done as soon and as rapidly as possible immediately after receiving the skull injury. The soldier should be at once taken to the surgical hospital and there permitted to rest for at least 14 days. Many cases with unconsciousness wake up after several days of rest and improve in a most unexpected fashion and go on to improvement and even recovery. While operated cases who have the advantage of absolute rest sometimes surprise the surgeon in the way they improve from an almost hopeless condition. Under no circumstances should a freshly operated patient be subjected to a prolonged transportation. This is dangerous.

Gunshot Wounds of the Chest. Sir John Rose Bradford. *The Lancet*, January 29, 1916.

The author having studied many hundreds of cases of thoracic injuries among the wounded in France, details his experience. The larger part of the article is devoted to hemothorax. This may follow a non-penetrating or a penetrating injury. In the former variety, the hemothorax is not markedly different from the common variety, is usually of small size and not uncommonly is infected. In penetrating wounds, hemothorax may result when the wound is not in the chest itself, but in the neck, arm or upper abdomen, and further it may occur on the opposite side of the body. Double hemothorax is not uncommon and may go on to recovery. Subcutaneous emphysema is often present. In a series of 450 cases of hemothorax, about 25 per cent was infected.

Sterile hemothorax: Hemoptysis is present in a large number of cases but is only very rarely fatal. Fever is almost always present, usually not higher than 102°; but if expectant treatment is pursued this may continue indefinitely. If, however, the fluid is aspirated many of the cases become at once afebrile and go on to convalescence. A second group however even after paracentesis may continue to run temperature suggesting infection, when the cultures are all sterile. Such cases, however, gradually come down to normal after a few weeks and get well. In the first 12 to 24 hours after injury, well-marked physical signs are absent, even the very marked symptoms are present. Displacement of the heart may be found, with signs denoting poor entry of air into the chest, but the percussion note is not markedly dull. Twenty-four hours later, however, typical signs of effusion are present. If the fluid is not aspirated marked retraction rapidly supervenes.

As to the treatment, in the earlier cases an expectant treatment was followed, but it was found that although the patients recovered, they remained feeble and ill for a long time. Later, the cases were treated by aspiration accompanied by oxygen replacement. This was found to yield excellent results and should be the treatment of choice. The fever disappears and collapse of the lung is prevented.

Infected hemothorax: Bacteriological studies showed that 25 per cent of the hemothorax cases were infected and that of these, 20 per cent were infected by lung organisms and 80 per cent by organisms derived from the exterior. Infected cases must be recognized at once in order that early effective treatment be carried out. Prompt drainage will save life. The diagnosis can only be made by exploratory aspiration, as the symptoms may be identical with those of the sterile variety.

The Treatment of Gunshot Wounds of the Knee Joint. A. L. Lockwood. *British Medical Journal*, January 29, 1916.

The author bases his observations upon the study of 60 cases. The most important points in connection with such wounds are the following:

1. That all foreign bodies, whether metal or loose bone, should be removed from the knee-joint at the earliest possible moment.
2. Perfect immobilization is absolutely necessary. Do not start passive movements too early; wait at least three weeks after the inflammation has subsided.
3. Absolutely complete excision of all necrotic or even edematous tissue.
4. The capsule should be closed at the first operation if at all possible.
5. Antiseptics, except saline solution and formalin, should not be introduced into a joint.
6. Tubes should never traverse the joint surface as in Barnard's method.
7. Patients should not be moved till one is satisfied that infection has been successfully combated.

There was only one death. Amputation was necessary only three times and free movement of the joint was obtained in 49 of the cases.

Sodium Hypochlorite in the Treatment of Septic Wounds. F. J. A. Dalton. *British Medical Journal*, January 22, 1916.

The results obtained by the use of sodium hypochlorite in the present war have been so remarkably satisfactory that Dalton believes it should be the method of choice. He concludes as follows:

The advantages observed in the employment of the sodium hypochlorite solution in the treatment of septic wounds may be briefly stated as follows:

1. The simplicity and cheapness of preparation of the antiseptic.
2. Being non-toxic and non-irritating to the tissues when properly prepared according to Dakin's formula, the hypochlorite solution may be safely used in large quantities over long periods of time without ill effects.
3. The deodorant action of the solution is remarkable. The fetor from gangrenous tissues usually disappears in 24 hours.
4. The rapidity with which sloughs separate and clean granulation tissue is formed in a wound under its influence.
5. The infrequency of re-dressing required by cases treated as described with hypochlorite, compared with the constant change of dressings required in large wounds with other forms of antiseptic.
6. The fact that injections of the hypochlorite solution into the rubber tubes used in the dressings may with safety be entrusted to very imperfectly trained orderlies without fear of ill results, once the case has been adequately dealt with by the surgeon.

The facts referred to under (5) and (6) are very important considerations in war surgery, as cases frequently arrive in large numbers at varying intervals.

Shot Injury of the Brachial Plexus, Suture and Cure.

(Schussverletzung des Plexus brachialis, Naht, Heilung.) SIEGMUND AUERBACH, *Munchener Medizinische Wochenschrift*, November 16, 1915.

Inasmuch as the prognosis of shot injuries and in fact other injuries of nerve plexuses is stated by both neurologists and surgeons to be unfavorable, Auerbach reports a case the success of which contradicts the current opinion. The patient was an officer who received a bullet wound in the neighborhood of the spinous process of the seventh cervical vertebra. The point of exit was one and a half centimetres wide and situated two centimetres above the clavicle to the outer border of the sterno-cleido-mastoid. The patient complained of very severe pain over the outside of the upper arm, on the posterior and external aspect of the forearm and on the external border of the palm as well as the back of the thumb. There was hypersensitiveness to all the tests. He could raise his shoulder but not his arm, nor could he move his forearm or rotate it externally. There was slight atrophy of the deltoid and of the flexor muscles of the forearm. At operation the fifth cervical root was found embedded in a thick cicatrix a half inch wide. This was resected and the distal and proximal ends of the nerve were approximated by catgut sutures. Several sutures were passed into the perineurium. The sixth cervical root was also found embedded in a dense cicatrix but had not been severed. The cicatrix was excised. The suture held. The dressing was so applied as to fix the head flexed toward the elevated shoulder. Soon after the operation a very vigorous electro and mechano-therapeutic course of treatment was instituted which lasted eight months. The author considers this as of the greatest importance and ascribes a great part of the cure to the post-operative treatment.

Ten Suggestions to Physicians in the Treatment of Eye Injuries and Eye Diseases During Service in War.

(Zehn Rathschlage fur Aerzte zur Behandlung von Augenverletzungen und Augenerkrankumgen im Kriegsdienst.) Dr. E. V. GROSZ, *Munchener Medizinische Wochenschrift*, November 16, 1915.

1. Bandage the injured eye; place loose sterile gauze over the lids, cover with cotton and bind with a mull bandage.
2. The bandage should be removed after 24 hours and not later than 48 hours, as the conjunctiva of the wounded eye secretes.
3. To cleanse the lid margins use 3 per cent. boracic acid solution. Do not use strong antiseptic solutions.
4. The pupil should be dilated with 1 per cent. atropin except where increased intraocular tension, as determined by palpation, is present. In such event use 2 per cent. pilocarpin drops instead.
5. Foreign bodies in the eye are suspected when there is a small point of entry, hemorrhage within the eye or traumatic cataract. The diagnosis is established by means of *x*-rays and in case of pieces of iron by means of the sideroscope. In any event the patient suspected of foreign body in the eye should be immediately transferred to an eye-clinic or such department provided with the necessary equipment for removing iron splinters by magnets, or by operation. Every day delayed is dangerous for the eye.
6. Shattered remains of the eye from which light perception is gone, must be removed in the interest of the other eye. In the presence of a traumatic iridocyclitis associated with destroyed light perception the eye should be removed. Enucleation should provide for the preservation of the conjunctiva and of the eye muscles so that an artificial eye may be the more properly adjusted.
7. Splinters and shots which are concealed in the orbit without causing any reaction may be left undisturbed.
8. Lid defects and ectropion should be remedied as soon as possible.
9. Suppurative infections of the conjunctiva are contagious. The eye in such case should not be bandaged but should be washed frequently, while the healthy eye should be protected. Such patients should be assigned to an eye department.
10. Trachoma may be detected by reflecting the upper lid where at the conjunctival reduplication the characteristic nodules, hypotrophic areas and scars may be seen.

The Physiological Treatment of Bullet and Shell Wounds of the Peripheral Nerve Trunks.

HENRY H. M. LYLE, New York. *Surgery, Gynecology and Obstetrics*, February, 1916.

In this article, based on experiences with the American Ambulance, Juilly, France, Lyle emphasizes the importance of continuously supporting the extremity in such a manner as to avoid joint contracture and fatty degeneration of the stretched, paralyzed muscles. Thus for the dropwrist of musculospiral paralysis a Fuller palmar splint is used which extends the wrist and abducts the thumb. The nutrition of the muscles is maintained by warm starch baths, systematic massage, kneading and exercises. Electricity only is insufficient.

Pressure of a bone splinter, an inflammatory exudate or a shell fragment may cause irreparable damage. Such condition needs prompt recognition and treatment. Primary nerve suture is rarely indicated in war injuries. Support of the paralyzed muscles must not be deferred to the so-called after-treatment.

Operative Treatment of Gunshot Injuries to the Peripheral Nerves.

H. E. SCHIFFBAUER, Konigsberg. *Surgery, Gynecology and Obstetrics*, February, 1916.

In cases of complete nerve severance of long standing the sensory field may have diminished in size due to collateral branches. Complete sensory inhibition in all qualities is not always found when the nerve is completely torn. On the other hand nerve continuity may be intact notwithstanding complete motor and sensory paralysis. Failure to improve in three months indicates operation. In cases of partial motor and sensory paralysis of a peripheral nerve operation is indicated if marked improvement does not take place in eight months.

Schiffbauer does not agree with the neurologists Oppenheim and Rothman in delaying operation for several months, but for many reasons favors operation as soon as the wound is fully healed and the danger of infection is past. In badly infected cases he waits six to eight weeks after wound healing, in clean wounds three to six weeks. Severe and uncontrollable pain is an indication for operation. Neuroma formation was found in all the fragmented nerve ends.

The important points in the operative treatment are accurate coaptation of the normal nerve ends in their physiological, anatomical relation; aseptic healing *without hæmatoma formation;* early passive and active motion, massage, heat and electricity.

The operations were performed *without a tourniquet.* The wound must be dry before closing. A compressive dressing must be applied to control oozing; it is better to drain for twenty-four hours. Hemorrhage from cross-section of a nerve is controlled by digital compression of the nerves or, if necessary, by twisting the vessel with a fine hemostat.

Important factors in the technic of neurorrhaphy, including the determination of scar tissue in the nerve, are given in the article.

Cancer of the Breast: Figures Which Show that Education can Increase the Number of Cures.

JOSEPH C. BLOODGOOD, Baltimore. *Journal of the American Medical Association*, February 19, 1916.

Bloodgood is under the impression that during the last five years there has been a change in the relative proportion of the benign and the malignant growths of the breasts and that the latter are decreasing, and that this change is associated with a shorter duration of the disease and with earlier seeking of relief. He did not realize, however, that the change is as great as the statistics indicate. A study of 1577 cases in the records of the Surgical Pathological Laboratory of the Johns Hopkins Hospital gives the following figures: "From 1890 to 1900, the percentage of benign lesions was 32; from 1900 to 1910, 41; from 1910 to 1913 it was 47 and from 1913 to 1915, 59, or from 1910 to 1915, 54. Therefore in about six years as compared with the previous ten the percentage has increased from 41 to 54 (13 per cent.). For the past three years it has increased 12 per cent. over-the previous three years.) Only definite undoubted cases of benign lesions are included in the above. Inoperable cases are distinctly on the decrease. The figures also show increase in certain types of adenocarcinoma, while malignant cystic adenoma seems to have decreased, and cancer cysts are apparently disappearing. Other forms that are increasing in frequency are the malignant papillomatous cysts and colloid cancer. Adenocarcinoma of the duct-cancer type is increasing, but the type of adenocarcinoma in which there is the greatest increase is that which may develop in the so-called chronic cystic mastitis of the adeno-cystic type. Adenocarcinoma with areas of cancer is increasing, but the type of adenocarcinoma in which there is the greatest increase is that which may develop in the so-called chronic cystic mastitis of the adeno-cystic type. Adenocarcinoma with areas of cancer is increasing, especially since 1913, and chronic mastitis not associated with lactation appearing as a somewhat circumscribed tumor shows a marked increase. The only way in which he can explain this is that a certain type of a circumscribed scirrhous tumor shows a greater decrease than any other form of malignant growth. Bloodgood's evidence seems to show that chronic cystic mastitis with large cysts has a tendency to disappear spontaneously and that if women delay it will be less frequently seen; it will be otherwise, however, if they seek advice early. The benign form of chronic cystic mastitis without large cysts is distinctly on the increase and the percentage of the malignant form has increased. We have evidence, therefore, that cancer in the adenocystic mastitis is an early form of cancer, and if the patients seek operation early, as seems to be the case, the percentage of cures will increase from 90 to 100. If women come early we shall find that the border and group is large and the difficulties of diagnosis will be increased. It is Bloodgood's opinion, however, that if every case is carefully investigated the mistake of incomplete operations will never be committed, but the mistake of performing a radical operation for a benign lesion will occur in from 10 to 20 per cent of the cases. He is quite certain, however, that when women appreciate the situation they will prefer the slightly mutilating operation to the danger of an incomplete removal of a malignant growth.

Laboratory Diagnosis of Chronic Infections of the Urinary Tract in Women.

Arthur H. Curtis, Chicago. *International Journal of Surgery*, January, 1916.

Even small amounts of pus in the urine should be investigated and not carelessly ascribed to vaginal contamination. Persistent pyuria in the absence of an easy demonstrable bladder lesion is held to be almost invariably due to a kidney disease.

Curtis suggests the following method of examination for obscure cases of renal tuberculosis. Provided the lungs are normal, potassium iodide is given for a period of several days. This is followed by the administration of 1/10 mg. old tuberculin twenty-four to forty-eight hours before examination. Massage of the kidneys several times daily in conjunction with the iodide and tuberculin tests aids in the production of a focal reaction. Finally, liquids are limited to a minimum before the collection of specimens with the two-fold object of irritating the kidney through the concentration of solids and increasing the number of bacteria in a given quantity of urine. Urine so obtained is examined after centrifugation in a high power centrifuge, which is held to be vastly superior to those in ordinary use. In the event of negative findings, many specimens are examined. Petroff's cultures and injection of medium sized guinea-pigs are also used.

Curtis draws the following conclusions:

1. Chronic infections of the urinary tract can be best diagnosed by one who is actively engaged in clinical work, including cystoscopy and in laboratory study. Careful correlation of clinical findings and laboratory methods, with extensive modifications in cultural technic to meet individual cases, is essential.

2. The source of even small amounts of pus in the urine should be investigated; the place of its formation should be definitely localized through the assistance of ureteral catheterization.

3. Persistent pyuria in the absence of a gross bladder lesion is almost invariably due to kidney disease.

4. In those frequent cases with bladder irritability which yield clear, bacteria-free urine, cultures from the traumatized urethral canal, or from the introduction of a probe into Skene's ducts, may demonstrate the cause of infections. When bacteria are widely scattered or grow with difficulty, a mixture of the urinary sediment with blood, followed by making a large number of ascites-bloodagar tubes, of high dilution, results in conditions favorable for the development and isolation of the bacteria present.

5. Experience teaches that the chief lesions in urinary tuberculosis are usually renal. In obscure cases laboratory diagnosis is facilitated by the use of potassium iodide, tuberculin, kidney massage, limitation of liquids, repeated examinations of fresh specimens after high power centrifugation, Petroff cultures, and injection of a series of medium-sized guinea pigs.

6. There is seemingly a tendency to lay undue stress on functional urinary tests at the expense of careful routine examination.

The End-Results in Seventy Consecutive Cases of Umbilical Hernia Operated Upon at the Massachusetts General Hospital.

C. C. Simmons, Boston. *Boston Medical and Surgical Journal*, March 9, 1916.

Small umbilical herniæ in thin adults, and umbilical hernia in children, may be cured by any operation which removes the sac and closes the defect in the abdominal wall.

Cases of umbilical hernia in stout adults are difficult to cure. The Mayo operation, of transverse closure of the ring, with an overlap of the aponeurosis, gives the best results.

In adults, closure of the ring by any other method than the Mayo, in a general hospital, is followed by 46.4 per cent. of recurrence.

Recurrence, if it is to take place, usually does so in less than one year.

The suture material employed has no relation to the liability to recurrence.

Skin sepsis is very likely to occur, but, apparently has no relation to recurrence.

The Diagnostic Value of Gonococcus Vaccine.

(*Der diagnostische Wert der Gonokokkenvakzine.*) Professor Asch and Med. Stud. Adler, *Münchener Medizinische Wochenschrift*, No. 3, January 18, 1916.

In patients who had an attack of urethritis, treated or untreated, it is of the greatest importance to determine whether the Gonococcus is still present in their secretions. It has been the practice of the authors when treatment is concluded and the soldiers suffering from an attack of gonorrhea are ready to be discharged as clinically cured, to inject from 50 to 100 million killed gonococci intramuscularly preferably in the gluteal region. This vaccine injection is claimed by the authors to be provocative of the residual gonococci which may have previously failed of detection by microscopic examination. Two to three days later the secretions from the urethra and the prostate are examined. Frequently after this provocative injection of the vaccine, gonococci appear. Usually they are degenerative types, are usually large, swollen and spherical instead of kidney shaped. Of special value is this vaccine injection in chronic urethritis in which there are secondary bacterial invaders, principally the suspicious diplococci.

A Sign in Fracture of the Pelvis.

G. P. Coppernail, Bedford, New York. *Medical Record*, March 4, 1916.

The sign that Coppernail refers to is ecchymosis of the perineum and scrotum in men, and of the perineum and labia in women. It is invariable in fractures of the pubis (the most common form of fracture of the pelvis), but may be absent in small fractures of the crests of the ilium.

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APRIL 1916

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THE USE OF COLLOIDAL (GELATIN) SOLUTION IN LOW BLOOD PRESSURE.*

James J. Hogan, M.D., M.R.C.S. (England).
San Francisco, Cal.

In order that you may fully understand the principles on which the perfusion of a colloidal solution is based, it will be necessary for me to review a few results of experimental facts that we think form the basis of our contention.

The original work was done to determine why the blood, a fluid containing 90 per cent. of water, remained in the blood vessels and why the various salt solutions (Ringer's and Lock's) when given intravenously were quickly lost from the circulation and appeared as urine. Those who are interested in the scientific part of this problem will find the detailed experimental proof in an article published in the Kolloidchem. Beihefte 3, 385 (1912) on "The Theory and Practice of Transfusion," by Martin H. Fischer and myself; and a more detailed article on its clinical application in the Journal of the American Medical Association, February 27, 1915, "The Use of Colloidal (Gelatin) Solutions in Shock," by James J. Hogan.

Let us ask ourselves why all the blood is not poured out as urinary secretion or lost into the tissue spaces? This is biologically just as important, and medically and surgically just as practical a question as the ways and means by which a urinary secretion is maintained and increased or decreased.

The maintenance of a normal circulation is necessary in our complex organism. It provides the cells with materials necessary for their life and removes the products of tissue waste. That part of the problem of maintaining a normal circulating fluid is usually taken pretty much for granted. If, by accident or otherwise, one of the larger vessels is opened in man or laboratory animal, we see following each other in the course of a very few minutes all those symptoms which culminate in death. When now we try to see why this occurs, it is quickly brought home to us that the most serious mischief done by the hemorrhage does not reside in a great loss of red blood corpuscles or in a loss of certain of the chemical constituents found in the blood, but in a diminution in the volume of the circulating blood. The proof for such a conclusion is easily brought, for to protect or save an animal from the effects of hemorrhage it is not necessary to transfuse blood; transfusion with water containing various salts may do. But though these salt solutions work excellently, they do this for a limited time; their effects wear off so that the individual who has been roused from the effects of a great hemorrhage begins to sink again. It is easy to see why this happens. *The injected salt solution does not remain in the blood vessels,* it appears as urine or is taken up by the tissues, and the blood pressure falls. If the water could be retained in the blood vessels we would get more lasting results from the injection of a salt solution. In our experimental work on animals, we found that the infusion of salt solution of various strengths did not remain in the blood vessels and so did not raise the blood pressure, and that when stronger solutions than those of the physiological type were used, the loss of fluid was greater the greater the concentration of the salt in the mixture. Working with various colloids (casein, horse blood serum, globulin and gelatin) we found that equal quantities of fluids combined with a colloid would stay in the blood vessels, there would be a rise of blood pressure to a normal point, none would be lost by the kidney or into the tissues. Our reasoning from these experimental facts led us to the following conclusion: *That the blood remains in the blood vessels because all of the water is held as hydration water combined with the colloids, and in this form cannot escape as secretion.*

If our reasoning be correct, we would expect that the intravenous use of colloidal solutions would be more lasting than solutions containing free water, and in this we have not been disappointed. After three years work I have come to the conclusion that a properly prepared 2½ per cent. *gelatin solution* answers our purpose very well.

Preparation of Gelatin Solution.

25 grams of purest gelatin,* 1.5 grams of sodium chlorid, and 100 cc. of distilled water are placed in a flask and boiled for 15 minutes. The resulting solution is filtered through heavy paper in a hot funnel and then autoclaved for an hour at 124° C. (255.2° F.). It is then chilled in an ice box. The gelatin has the proper colloidal qualifications if under these circumstances it solidifies. In this form the gelatin is kept until needed. In order to prepare the transfusion mixture, the flask of gelatin is warmed until it melts, when it is added to 1000 cc. 0.9 per cent. sodium chlorid, to which has been added 2 grams of sodium carbonate crystals ($Na_2CO_3\ 10H_2O$), all warmed to body temperature.

The completed solution may be given intravenously by gravity in a Fowler bottle with rubber tube and cannula attached. It should be given very slowly, allowing 20 to 30 minutes for each 1000 cc. The total amount used will depend on the blood pressure. I continue its use until the blood pressure is raised to about 120. As the veins are collapsed in the severe cases of shock, I always cut down and expose a vein at the bend of the elbow. Selecting a cannula of small bore, I tie this in the vein and start the solution very slowly. By using the manometer on the opposite arm the pressure may be taken after each 250 cc. has been given, and may be stopped when it has been raised to a safe level. The only after effect I have encountered is a chill in some cases, but this need not worry you as it passes off in about five to ten minutes. In a few cases patients started to perspire freely, but this was controlled by 1 cc. of Pituitrin intramuscularly.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, June 21, 1915.

* The gelatin must be fresh and of high quality. Ordinary or old gelatin not only does not jell properly, but is often so rich in protein split decomposition products as to be dangerous for intravenous use. Dr. Hogan has used Stoess and Company's, (Heidelberg) purified product. Recently E. R. Squibb and Sons and the Intravenous Products Company have begun marketing the colloidal (gelatin) solution in ampule form ready for use. Ed.

It can, of course, be foreseen that what may be actually accomplished by gelatin transfusion in any case of low blood pressure depends on the intensity, persistence and nature of the factors responsible for it. Viewed in this light, it is not remarkable that our experience thus far has seemed to indicate that cases of shock consequent on simple hemorrhage are most easily relieved. Even some cases showing severe degrees of anemia rallied and got well. Shock consequent on injury, or a surgical operation in the ordinary clean cases, seems to be controllable almost as easily. Least hopeful are the septic cases in which the low blood pressure is in greater measure dependent on a heart suffering from a general intoxication, but as I find these patients are all suffering from an acid intoxication, every effort to relieve this should be made. The use of sodium bicarbonate 2 per cent. and glucose 20 per cent. as a rectal drip should be tried.

While it is impossible in the short space at my disposal to go more deeply into this subject, I hope that the application of the principles I have attempted to place before you may be the means of increasing your armamentarium in the conditions of low blood pressure that come under your care.

350 Post Street.

DISCUSSION.

Dr. E. I. McKesson, Toledo, Ohio: I cannot discuss this interesting paper because I have not had any experience with the method, but it is a very important subject, and I would like to have some additional information. How close does Dr. Hogan permit the blood pressures, after they have gone down, to return to normal by the injection of the colloidal solution? For instance, a patient's blood pressure before operation is 120 systolic and 80 diastolic; shock develops and the pressure drop to say 70 systolic and 50 diastolic. Now during reaction, what is the pressure at which the injection of the solution should cease?

Dr. James T. Gwathmey, New York City: This has been one of the most important papers of our scientific session, and the practical use of the method should enable us to save many lives in the future. In a few personal cases, we have given amounts of normal saline solution that would startle a good many surgeons and anesthetists, for instance, one or two quarts during an operation, but without apparent injury to the heart, or embarrassment of circulation or respiration. On the contrary the injections benefited the patients and served to keep the blood pressure and pulse rate nearly normal. According to Dr Fischer and Hogan's colloid theories, I suppose the acidity of the different tissues would be amply saturated by this large amount of saline, and yet there would be enough left to fill the blood vessels. Dr Hogan is to be congratulated on basing his practical method on such fundamental and scientific physiological principles, and we should help to circulate the knowledge he has given us, in promoting the routine use of this colloidal solution in the various forms of shock and hemorrhage. This method should be made a part of the anesthetist's armamentarium for immediate use when needed.

Dr. J. E. Engstad, Minneapolis: I would like to know if Dr. Hogan takes into consideration that cases are artificially sensitized by material like the old-fashioned antitoxin we used to use, or by repeated hemorrhages, resulting in anaphylaxis.

Dr. F. D. Bullard, Los Angeles: I should like to ask Dr. Hogan if he always uses the solution intravenously. Could it be used hypodermatically or in the rectum?

Dr. Philemon E. Truesdale, Fall River, Mass.: As another, who is very much interested in this method of transfusion, may I ask Dr. Hogan if, in an instance of shock from a prolonged operation, where there has been very little hemorrhage, he would recommend the use of the colloidal solution? What would be the effect of increasing the load on the heart?

Dr. James J. Hogan, closing discussion: As I said before, it would be impossible in the short space of time we have to review many of the things that have been done in this work that led to our final conclusions.

I have used this solution in something over 35 cases, and it has been used in San Francisco by at least two other surgeons in something like 15 cases. In all the cases I have used it in, we have made a very careful examination of the blood pressure after every 250 cc.'s were used. It is not always possible to do that, and unless you have a blood pressure instrument handy you must depend upon your pulse. We depend upon the blood pressure. If the patient has a pressure of 125, we try to raise it slightly above the point it was before—if it was 120 we try to get 130; and once it is up, the slightly hypertonic solution makes the tissues give more water to the blood and you will find your blood pressure will hold. I have transfused animals with this solution until practically twice the amount of the volume of blood had been put in, without any injury to that animal outside of the fact that he would have interference with his respiration, due to overfilling his blood vessels. I used 3,800 cc. in one case and the patient got well. I have used it in five cases where there was no pulse at the wrist and a bare flutter of the heart, and no pressure registering by the manometer. In one case we put in 2,200 cc. before the manometer registered. I have not advised it until it was absolutely safe in the hands of any physician who could cut down upon a vein and put in salt solution.

As to the effect on the heart. If you use a very small cannula you will not have any accidents. You must put it in very slowly, and this applies to any intravenous perfusion work.

One point might be brought out in relation to the treatment of toxemic cases. We have found recently that the use of sugars in high concentration is a great help in cases of toxemic shock. In these cases we try to get in as much dextrose as possible, by the vein if possible. We always use sodium bicarbonate or any of the calcium salts by the mouth, following the transfusion, to offset the acid intoxication. It is absolutely necessary to get your patient passing urine that is alkaline.

As to the sensitization of the patient, we have never had any trouble. The question of anaphylaxis is not thoroughly understood at the present time.

As to symptoms after giving, you will not have any more symptoms than after a large infusion of salt solution. After you give a large injection of salt solution intravenously, you have some chill. In case of toxemic shock the blood pressure will drop because the tissues have robbed the blood of its fluid.

I find in these conditions there are only two drugs that are of any use: digitalis in a failing heart, and pituitrin in these cases will contract the peripheral vessels and probably save many patients who would die from toxemic shock. We thought it would not be efficient in toxemic shock, but in the last few months we have changed our minds, for by the use of digitalis and pituitrin, with sugars and sodium bicarbonate by rectum, the results are more encouraging. I had one case of hemorrhage following a double antrum operation in a patient markedly toxic, with blood pressure of 55 and haemoglobin of 15 who recovered after 2,200 cc. intravenously.

In regard to its use under the skin or in the rectum: you must put it into the circulation. It is a colloid and would not be absorbed by any tissue until by some chemical means you break down the colloid and obtain water from it.

In treatment of prolonged operations, where shock is not due to hemorrhage, we have had most brilliant results. Recently I had two cases where the patients went out on the table pulseless and with no blood pressure registering on the manometer. In one case we used 1,500 cc. and in another 2,100 cc. and both recovered.

In this colloidal solution you have at your disposal an easily prepared safe solution that may be used intravenously even in large quantities.

LOCAL ANESTHESIA IN NOSE, THROAT AND LARYNX OPERATIONS.*

Myron Metzenbaum, M.D., F.A.C.S.,
Cleveland, Ohio.

A patient undergoing an operation on the nose, throat, or larynx is subjected to the same shock and to the same risks as though the operation was on any other part of the body, and must be operated according to the same surgical principles that govern other operative procedures.

At least a cursory physical examination should be made, to exclude gross lesions of the heart, kidneys, pulmonary and respiratory organs; to obtain knowledge of the presence of an enlarged thyroid or thymus gland, of chronic or acute infections, of diabetes, or hysteria, so there is a reasonable assurance that the local anesthetic will be absorbed and will react in the physiological manner, and that the patient will have a natural tolerance for the drug.

Crile has shown that the cortical brain cells are exhausted and even disintegrated in the same manner and to the same degree by *fear* or *fright* as by *pain* resulting in shock. The success of an operation then depends on how perfectly the preoperative fear is eliminated and how effectively the local anesthetic or the general or regional anesthetics are administered, so that no painful impulses are transmitted from the field of operation to the brain during and at least for a short time after the operation. A general anesthetic puts to sleep only the motor areas of the brain, but the sensory areas of the brain still receive the painful impulses from the operated field. These can be eliminated by anesthetizing the field of operation by a local injection of cocaine or novacain or by injecting cocain or novocain around or into the nerve trunks supplying the field of operation.

Just as the *Professional General Anesthetist* is recognized today; so the time will come when there will be *Professional Local or Regional Anesthetists*, who will be skillful in injecting local anesthetics around the nerve trunks so as to produce regional anesthetic areas. For example, a professional local anesthetist will inject the various branches of the facial nerve for operations on the various parts of the face and especially the jaws and teeth, after which a dentist can either extract teeth or remove nerve roots, or he will inject the axillary nerves or certain spinal nerves and so on. No doubt in time it will become feasible to inject what we now look upon as deep seated nerve trunks.

A well administered local anesthetic like a well administered general anesthetic is a valuable factor not only during the operation, but also in the post-operative stage. The important factors of a local anesthetic are the prevention of fear of the operation, the perfect anesthetization of the field of operation, and at least a partial postoperative anesthesia, all to be accomplished by the application or injection of a drug or combination of drugs whose toxicity is within the limits of safety.

The prevention of fear and the quieting of the mind, so as to eliminate brain cell exhaustion and destruction from this source is almost perfectly accomplished by the administration of scopolamin or hyoscin with or without morphin.

In 1901, after two years of experimentation and clinical test, I introduced the use of scopolamin preliminary to both general and local anesthetics, until at the present time its use has become almost routine.

Scopolamin acts as though it had two radicals, the one a decided brain sedative for after the administration of a physiological dose of scopolamin the preoperative nervous fear and irritability is changed to one of calm and quietude, so that when desirable the patient may be placed directly on the operating table without manifesting the usual fear and excitation. Scopolamin places the patients under a mild anesthesia; therefore, in administering ether or nitrous oxid oxygen gas patients go under the general anesthetic more rapidly, with less resistance, requiring less anesthetic to maintain an even anesthesia, awakening more rapidly, at the same time the analgesic effect lasting for several hours. In gas-oxygen narcosis, scopolamin renders greater muscular relaxation and at the same time gives a better vasomotor tone.

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*Read during the Organization Meeting of the Interstate Association of Anesthetists, Cincinnati, O., May 4-5, 1915.

In operations on the nose and throat under cocain or novocain the preliminary administration of scopolamin is of the greatest value. The usual fretful, excited, restless patient becomes quiet, interested and helpful, and in cases of the removal of tonsils or foreign bodies from the throat the patient will often hold the tongue-depressor and be entirely free from the usual constant desire to spit, cough, gag or explode their breath.

In nasal operations the preliminary administration of scopolamin lessens the amount and strength of cocain or novocain required and anesthesia of the bony areas is decidedly more effective, as in the opening of the antrum or sinuses.

When scopolamin is administered in physiological doses it seems free from any immediate or remote detrimental effects, while its benefits are to quiet the patient, benumb his sensibilities and lessen his irritability to such a degree that he requires less local or general anesthesia to complete the operation.

In nasal, pharyngeal and laryngeal operations the manipulation results in a greatly increased amount of mucous which tends to wash away any anesthetic applied locally. It also forms a coating of mucous over the surfaces so that the local anesthetic can not act as readily.

The second radical of scopolamin acts similar to that of atropin checking the glandular secretion of the mucous membranes as much as the same dosage of atropin would have done, so that in bronchoscopy there is almost no secretion to wipe away. In operations with local anesthesia on the throat there is almost no saliva to annoy. In operations on the nose, the abundant nasal secretions are lessened and the usual profuse discharge following any extensive nasal manipulation or operation is held in check for several hours.

The atropin radical does not check the secretion of the kidneys, but it holds in check the bronchial mucous secretion during ether anesthesia.

Also the atropin radical, like atropin itself, prevents reflex inhibitory stimuli coming through the superior laryngeal nerve and its branches to the vagus. It is, therefore, of value if given before operations for the removal of adenoids, tonsils or operations around the base of the tongue, thyroid gland or larynx, in bronchoscopy, esophagoscopy and especially in removing foreign bodies from the pharyngeal or laryngeal region, when considerable traction of the tongue is required. Since children tolerate atropin well, it is not surprising that they also tolerate scopolamin without untoward effects.

Pain In a Field to be Operated.—The prevention of pain is best accomplished by the application to mucous surfaces or injection into the tissues of weak solutions of cocain or novocain. The simultaneous contraction of the blood vessels in an area to be locally anesthetized intensifies and prolongs the action of the local anesthetic by preventing a too rapid general absorption. This can be accomplished by combining adrenalin or the synthetic adrenalin compounds with cocain or novocain.

Adrenalin or the synthetic compounds produce a vigorous contraction of the capillaries and small blood vessels when applied locally to the mucous membranes or when injected into the tissues, thereby lessening the general absorption. When combined with cocain or novocain solutions the retarding of the general absorption intensifies and prolongs the anesthesia by rendering the action more local and limited to the area of application or injection.

Adrenalin and the synthetic compounds are most powerful drugs and show an activity in strengths of one in 100,000. When injected into the circulation of animals the effects are 40 times as great as when injected into the tissues only. Therefore, the original solutions of 1-1000 should only be used externally on the mucous membranes. For injections 1-50,000 is sufficiently strong for capillary contraction. 10 minims of the 1-1000 solution is considered the maximum dose to be injected at one time.

The chief toxic symptoms are palpitation of the heart, oppression, and difficult respiration. Adrenalin is contra-indicated in the very young, the aged and in those suffering with heart lesions and diabetes. If the strength of the solution be physiological in its action on the capillaries the anemia will disappear gradually with a primary dilatation of the blood vessels, whose walls will return to normal. However, if strong solutions are used there results a vasomotor paralysis, the vessels can not contract for a longer period, during which time secondary hemorrhages may occur.

The application of strong solutions of adrenalin to the mucous membranes or the injection of strong solutions into the mucous membranes or tissues may completely interrupt the circulation for so long a period as to result in sloughing of the tissues.

The vasoconstriction caused by adrenalin is of the greatest value in securing a bloodless operative field. Adrenalin itself has no anesthetic properties but its vasomotor constricting action resulting in the blanching of the mucous membranes, allays congestion and thus relieves the pain of inflamed tissues.

Light and air deteriorate adrenalin and the synthetic adrenalin compounds and may render them both inert and toxic. The synthetic compounds are the more stable and better withstand a moderate amount of heating. The safest way of using either the organic or the synthetic product is in tablet form made into fresh solutions at the time of use. Adrenalin or the compounds are not altered by, nor do they alter cocain or novocain by being combined with them.

Cocain: The anesthetic action of cocain was discovered by Kohler of New York in 1884. It is a very effective local anesthetic when applied or injected in the mucous membranes or when injected into the tissues or around or into nerve trunks. It paralyzes the nerve endings—the sensory fibres before the motor. It produces a fair degree of contraction of the capillaries, thereby retarding rapid general absorption and thus increasing and prolonging its own action.

When combined with adrenalin or the synthetic adrenalin compounds, capillary contraction is increased, the general absorption retarded, thereby prolonging the anesthesia and rendering the action more local and more limited to the area of application or injection. In animal experiments I have determined that a 1/10 of 1 per cent., and at the highest 1/4 of 1 per cent. solution of cocain when injected is sufficiently strong to anesthetize effectively the mucous membranes, the skin, the deeper tissues and the nerve trunks, for a period of about 23 minutes.

When applied to the mucous membranes of the nose, throat and larynx, if there was a preliminary administration of scopolamin, then a 2 to 4 per cent. solution of cocain combined with 1/3000-1/5000 adrenalin will render the area anesthetic. If scopolamin was not given preliminary then the strength of the cocain solution required will be from 4 to 10 per cent. If a fresh solution of cocain is prepared with sterile water, in a sterile bottle and heated gently for a few minutes, it will be practically sterile and will have undergone no material change, and if the field to be injected and the syringe be sterile it can be used for deep injections. On prolonged boiling cocain liberates or decomposes into benzoic acid and methyl alcohol. On standing it also decomposes, with the formation of floculent particles.

Many patients manifest a decided idiosyncrasy to cocain. The toxic symptoms are often precipitated without notice or warning in rapidity similar to the sudden action of chloroform. This toxicity of cocain is in a measure controlled by combining it with adrenalin or the synthetic compounds of adrenalin, thereby preventing a too rapid absorption.

Patients lying down less often have the so-called cocain symptoms than when sitting, in the customary upright position for nose and throat operations, which shows that the so-called cocain symptoms are a combination of cocain effects plus cerebral anemia, probably resulting from fear. The preliminary administration of scopolamin lessens the cocain symptoms by preventing the element of fear.

Ether inhalations and ether by hypodermic are effective in overcoming the toxic action of cocain or even the convulsions.

Even in the hands of the experienced, unexpected toxic effects arise when using cocain in the weakest solutions possible, and so for many years a drug or chemical was sought which would have the same anesthetizing power as cocain with far less toxicity. In 1905 Einhorn produced the synthetic compound known as Novocain. After ten years of experience the unanimity of opinion is that when novocain is *injected* it can be used wherever cocain was found applicable, that its anesthetic properties are equal to those of cocain, while its toxicity is only 1/7 as great. When applied to mucous membranes novocain is less effective than cocain.

Physically novocain is similar to cocain, is soluble in equal portions of water, can be heated any number of times up to 120° without decomposing, and does not undergo changes upon standing. When injected it is as rapid in its anesthetic action as cocain, lasting about 23 minutes, and likewise it causes a contracton of the capillaries, somewhat retarding its own general absorption, thereby increasing and prolonging its own action. When combined with adrenalin the capillary contraction is increased thereby further lessening its absorption, prolonging its action, and limiting it to the area of injection.

The superiority of novocain over cocain is that when injected it has no chemical necrotic action on either the mucous membranes or the tissues. It has no secondary toxic effects on the circulation or respiration, it does not produce dilatation of the pupils (mydriasis), nor does the drug habit ever follow its use. It can be injected with safety in solutions of ½-1 per cent. up to a quantity of 5 to 7 grains. At the present time novocain approaches closely the ideal local anesthetic.

Quinin and urea-hydrochlorid when applied locally to the mucous membranes of the nose or throat has no anesthetic effects but leaves a disagreeable taste. When combined with cocain or novocain solutions and injected either into the mucous membranes or the tissues, it produces an anesthetic effect lasting for from several hours to a day or even more. When injected into the mucous membranes quinin and urea-hydrochlorid in strength as low as 1/20 of 1 per cent. produces an edema and infiltration lasting for 2 or 3 days or longer. This condition borders closely on a sloughing, and often produces a sloughing. When 1/20 of 1 per cent. of quinin and urea-hydrochlorid is combined with either cocain or novocain and injected into the comparatively loose tissues of the tonsilar pillars, for tonsil enucleation it produces an edema and induration which retards normal healing. Therefore, the lasting anesthetic effects compared with the healing is of questionable value in nose and throat operations.

However, when injected into the strong muscular tissues as in general surgery the edema and induration are not so material and the lasting anesthetic effects especially in extensive operations are of value in preventing the painful post operative impulses from traveling from the operated field to the brain.

It seems that both cocain and novocain are rendered somewhat less toxic by dissolving them in a calcium chlorid solution instead of the customary sodium chlorid solution.

Technic: Solutions to be injected should be near the body temperature, should be sterile, as should the syringe used, and the field of operation. The solutions should be isotonic so that the tissue cells are neither expanded nor contracted, should not be strongly acid nor strongly alkaline, nor chemically irritating due to its own ingredients or those of decomposition or chemical reaction, must not produce any local or general hemolytic action, should be injected slowly so as not to produce any mechanical injury to the mucous membranes or tissues by too rapid distension which may remain or may be followed by a too rapid contraction.

The comparative value of local as compared with general anesthesia is readily apparent. The field for the development of local anesthesia in all phases of general surgery and the specialties is wide open, and the nose and throat specialist is finding its adaptation to his work not only interesting, but of great promise.

768 Rose Building.

INTRAVENOUS ANESTHESIA.*

C. L. Candler, M.D.,
Detroit Michigan.

The last time I had the pleasure of watching Kocher, Von Eiselsberg, Hochenegg and other European surgeons perform major operations such as Thyroidectomies, Gastro-enterostomies, and Cranial surgery under novocain it occurred to me that we Americans were wasting a lot of ether on our patients which might far better be used to raise the efficiency of our low grade gasoline.

It is my belief that the American anesthetists have the world surpassed so far as inhalation methods of anesthesia are concerned. I have seen patients drowned with ether in London, Paris, Vienna, New York, and also in Detroit, but I have seen more poor anesthetics administered in Europe than I have ever seen in America. This I think is one of the principal reasons why local anesthesia has been slow in being adopted in this country.

Furthermore I believe that in 10 years or less 80 per cent. of our operations will be performed without general anesthesia. Scopolamin-morphin together with novocain is the nearest approach to that result at present, but in my opinion we will have some other drug or combination of drugs before that ideal will be realized.

Now in regard to general anesthetics I feel that we are not justified in saying that one method of anesthesia is adapted to all cases any more than one type of carburetor is suitable for all automobiles. Ether has its place, just so with Chloroform, Gas-Oxygen, Rectal Anesthesia, Insufflation Anesthesia and Intravenous Anesthesia.

Of what practical value *is* Intravenous Anesthesia? Before answering this question allow me to give you a brief history of this subject and the method of administering it.

General anesthesia by the intravenous method is not a twentieth century discovery. While not as old as inhalation anesthesia, it is said to have been employed by Ore of Bordeaux as early as 1872. Ore used chloral hydrate as the hypnotic agent in 51 cases with considerable success. A number of fatalities discouraged its employment until taken up by Burckhardt in 1909. Six years ago this investigator attempted intravenous anesthesia on the human subject after prolonged experimentation on the lower animals. Chloroform was first used, but was soon abandoned for ether, which was considered much the safer drug. One year later six surgeons at the Berlin Surgical Congress corroborated the work of Burckhardt.

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*Read during the Organization Meeting of the Interstate Association of Anesthetists, Cincinnati, O., May 4-5, 1915

The intravenous method was first used in America in the fall of 1912 by Honan, of the Metropolitan Hospital, New York. In February, 1913, Honan and Hassler reported 78 cases. Since this time the intravenous method has been employed in over 500 cases at the Metropolitan Hospital and elsewhere.

Fedoroff collected 530 cases from three Russian clinics, in which Hedonal, .75 per cent. in normal saline was used, in which there were no deaths that could be ascribed to the anesthetic. Last summer I carried on an extensive correspondence with Prof. Dr. Fedoroff of Petrograd which further substantiated his previous work on this subject and in which he stated that they were still using Hedonal Anesthesia and had administered it in over 3,000 cases without any fatalities due to the anesthetic. Unfortunately this interesting correspondence was suddenly terminated by the beginning of the present war.

Kümmel, in his contribution to Keen's Surgery, states that his experience with intravenous ether anesthesia has been so favorable that he looked upon its general employment as a consummation devoutly to be wished.

While even its warmest advocates do not anticipate the time when the intravenous method of administering general anesthetics will entirely supercede the inhalation method, there are special indica.ions for its adoption.

Among these are operations on the head and face in general, operations in the mouth and pharynx, operations on the upper jaw and tumors of the hypophysis.

The advantages of the intravenous method in such cases are obvious, affording as they do an uninterrupted anesthesia, with surgeon unhampered by the work of the anesthetist. The prompt introduction of normal saline in operations attended by severe hemorrhage or in cases already suffering from shock is frequently an advantage, not to be under-estimated. Intravenous anesthesia has been found to work satisfactorily with patients who have become emaciated from chronic disease, the rule is to find the pulse in such cases better after the operation than before. Recovery from the anesthetic is prompt and void of nausea, which in itself is a considerable advantage.

Further in the old inhalation method it is necessary to have a saturation of the entire respiratory tract with the anesthetic agent before anesthesia can be produced. This fact accounts for the stage of excitement, the irritation of the respiratory mucosa with the greatly increased amount of secretion, and the large amount of anesthetic stored up in the tissues. In intravenous anesthesia all this is changed. Our direct route into the blood stream eliminates the respiratory tract, the stage of excitement, nausea and vomiting and postoperative pneumonia.

VARIETIES OF INTRAVENOUS ANESTHETICS.

(1) Hedonal (Methylproplycarbinol-urethane) is a white powder, soluble in alcohol, ether and slightly in water. Hedonal .75 per cent. in normal saline produces a wonderfully smooth anesthesia resembling natural sleep. The objection to its use is the fact that a large number of red blood corpuscles undergo hemolysis. Fedoroff has had great success with this drug and says he has not experienced this difficulty.

(2) Paraldehyde 2.5 per cent. with ether 3 per cent. in normal saline also gives a smooth and rapid anesthesia, but increases the blood pressure beyond safe limits.

(3) Isopral and ether 7 per cent. in normal saline has proved to be the most satisfactory combination. Isopral (Trichlorisopropyl Alcohol) is a white crystalline substance, soluble in water and alcohol. Some authorities claim that ether is only soluble 5 per cent. in water. I do not dispute this but have found by experience that a 7 per cent. solution is the most satisfactory even though it may be only a saturated 5 per cent. solution.

TECHNIC.

I employ a modification of Honan's apparatus, consisting of two glass cylinders, one within the other. The outlet is controlled by a two-way stopcock.

Method of Mixing the Solutions: First, have all the necessary apparatus sterilized, 100 cc. of normal saline at 110 degrees F. for the Isopral and 2,000 cc. of normal saline at 85 degrees F. for the 7 per cent. ether solution. Ether boils at 90 degrees, so it is necessary to have the saline below that point.

I use 54 grains of Isopral and place it in a 4-ounce, wide-mouthed bottle and fill same half full with the 110 degree saline, cork the bottle and shake until dissolved. I then pour the contents of the bottle through several layers of sterile gauze into the remainder of the 100 cc. of saline and shake thoroughly again and this in the inner cylinder.

The ether solution I mix as follows: First I pour 50 cc. of ether into a 2,000 cc. flask or pitcher, then I add 500 cc. of normal saline at 85 degrees, then 50 cc. of ether and 500 cc. of saline, then 50 cc. of ether and 1,000 cc. of saline, making a total of 150 cc. of ether to 2,000 cc. of saline or a 7 per cent. solution of ether. The solutions are shaken thoroughly as each quantity of ether is added so as to obtain as reliable a mixture as possible.

The anesthetic is administered as follows: I cut down under novocain on the median basilic vein of either arm, according to the convenience of the surgeon, a canula is then inserted into the vein and the solution allowed to flow. I use a blood pressure cuff for a tourniquet. The solution of Isopral is permitted to flow into the circulation first, to be followed by the solution of ether. As a general rule it does not require more than half of the Isopral solution to induce anesthesia. The patient goes to sleep so quietly and rapidly that it will surprise you the first time you try it. The return to consciousness is almost as rapid, occurring practically when the anesthetic is stopped. The reflexes are observed to be the same as by the inhalation method.

When commencing the anesthetic I allow the solution to run in a fine stream and as soon as the patient is asleep I close the valve so that the solution will flow drop by drop. The exact amount and speed cannot be governed by any rule of the thumb as each patient is a problem in itself just the same as with any anesthetic and can only be learned by experience. The best way to learn this is to try it out on dogs and you will soon ascertain that it is easier to administer than by the inhalation method. In fact, in the Metropolitan Hospital we had the nurses mix the solutions.

Failure to produce anesthesia by this method is caused by one of two things: either your canula has too small a calibre or you are trying to induce anesthesia with normal saline, which cannot be done without a makeup. You probably mixed the ether alright but perhaps your thermometer was a few degrees off and the ether vaporized and ran away.

The dangers ascribed to the intravenous method of administering general anesthesia are embolism and dilatation of the heart. This to me has been over-estimated and appears to be more of a theoretic than of a practical objection. In my opinion there is no more danger in administering ether intravenously than in giving a solution of Salvarsan, providing, of course, that the man who is giving it has had some experience.

I have had 326 cases to date and have yet to see a fatality, but I wish to state that I examined these patients myself and didn't accept any overworked interne's ten minute history or relied on any sink test urinalysis. I believe that in a great many surgical hospitals there are breaks in ordinary hospital routine caused by too many operations and overworked internes and many fatalities which unfortunately sometimes occur might be explained.

Consider for a moment the Mayo Clinic with its world wide reputation. How many poor surgical risks do they accept?

We have already pointed out the advantages of the intravenous method in operations about the head. Its greatest practical value will be found in cases of intestinal obstruction, ruptured ectopic pregnancy, in amputations, or in case already suffering from shock in which normal saline is the best known stimulant.

To quote Kümmel: *"In the light of our experience intravenous ether anesthesia is a method which, providing the indications are properly observed, is superior to any other form of anesthesia. For many cases it is to be regarded as an absolutely ideal method, because aside from the fact that a small quantity of the anesthetic is employed, it has a distinctly stimulating action which can not be said of any other known method up to the present time."*

In my last series of cases I had one which I think is of unusual interest because of the length of time, two hours and forty minutes. Dr. Charles H. Oakman usually makes a practice of performing cleft palate operations by the Brophy method on adults in two steps because of the difficulty of maintaining anesthesia by the inhalation method and the considerable loss of blood. In this particular case Dr. Oakman thought it best to complete the operation because the anesthetic was operating smoothly and the patient showed no signs of shock.

ANESTHESTIC CHART

Patient Mr. M........ ... Age 35. Weight 145 lbs
Surgeon Dr Charles H. Oakman.
Operation—Radical cleft palate by Brophy method, including four silver wires with two lead plates and 41 horse hair sutures.

Anesthetic Started.	Anesthetic Stopped	Time
1.30 P. M.	4.10 P. M	2 hrs. 40 min.
Operation Started.	**Operation Completed.**	**Time**
1.35 P. M	4.15 P. M.	2 hrs. 40 min

Total quantity of 7 per cent. ether, 5,000 cc

	Day Before.	Beginning Anesthetic.	Anesthetic Completed.
Pulse	72	80	74
Respir.	16	20	16
S. B. P.....	135	145	130
D. B. P.....	90	95	85

Patient walked out of hospital on sixth day.

I wish to thank Drs. Clark D. Brooks, Charles

H. Oakman, William J. Seymour, and George M. Todd for their kindness and help in trying out this new method.

In conclusion I wish to thank you all for your interest in this subject and hope each one of you will try it out before you condemn it. It certainly is a great pleasure to me to have any paper discussed by men who have tested the possibilities of this method rather than by some one who has condemned it on some one's else say so.

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Discussion.

Dr. J. Edward Pirrung, Cincinnati: I am indeed indebted to Dr. Candler for having presented so concise. thorough and practical a paper upon the subject of intravenous anesthesia. I am sure the members of the Interstate Association of Anesthetists will give it the attention it so justly deserves.

My personal experience with the use of intravenous anesthesia began in 1912, and have continued to use the method in selected cases during the past 3 years. My experience in the human subject has been entirely limited to the use of Hedonal. In animal experiments I have used ether and chloroform. The time required for the completion of various operations performed under its influence varied from 10 minutes to one hour and forty-five minutes. The amount of solution required was from 400 to 1,500 cc. of a 0.75 per cent. solution of Hedonal in normal saline.

In no case did we fail to produce prompt anesthesia. All operations begun under Hedonal were completed under its use. without difficulty to the operator and without any apparent harm to the patients. In fact, its use facilitated operation, particularly procedures within the abdomen, because muscular relaxation was marked, although respiratory excursions were shallow and slowed.

I have resorted to the use of intravenous anesthesia only in very bad surgical risks, such as obstruction of the bowel, ectopic gestation, complicating heart and kidney lesions. or operations about the mouth. The absence of vomiting makes it valuable in obstruction cases. In ruptured ectopic gestation or other cases complicated by grave hemorrhage, the solution put into the vein gives you at once circulatory fluids as well as an anesthetic.

All these advantages are offered by the use of ether intravenously, and its use is said to be safer. I have preferred to use Hedonal on account of understanding its action better. I have observed no difficulty in its use from lowering of blood-pressure or hemolysis of the blood. We carefully checked up the effect of Hedonal intravenously and found at the beginning of the flow solution that blood pressure was slightly raised. while a few minutes later it dropped to or slightly below normal, where it remained at a constant level unless the patient was shocked by the trauma of the operative procedure.

Intravenous anesthesia can never supplant inhalation anesthesia for the reason that gas-oxygen-ether offers an eminently safe and satisfactory narcosis in routine cases. The intravenous method, however, deserves a permanent place among the proven and valuable methods of anesthesia for special operative procedures, and for use in hazardous anesthetic risks.

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PERSONAL EXPERIENCES WITH ANOCI-ASSOCIATION.*

Wallace Irving Terry, M.D., F.A.C.S.,
San Francisco, Cal.

It is a privilege to be able to speak to the American Association of Anesthetists and to express my appreciation of the honor in inviting me to the meeting. I am much indebted to several of your members, for without their cooperation I should not have been able to carry out the principles of anoci-association, as elaborated by Crile. It requires time to test out any new principles, but as I have worked along these lines for over three years, I feel no hesitation in expressing my convictions.

Crile's work on shock, begun years ago, has led him by logical ways to anociation—the prevention of shock—using the word in its larger sense. The sense of pain can be conveyed to the anesthetized brain as well as to the conscious one, and if the pain stimulus be sufficiently aggravated pathological changes may be demonstrated in the brain, liver and adrenals. We have been accustomed to think that because a patient recovers from an operation, it has been entirely successful, and yet serious damage may have been done to the individual which might have been avoided. Perfection of operative technic has naturally been sought by conscientious surgeons, but many of them do not take into consideration minor degrees of shock which produce no visible evidence. Too often have we seen these minor degrees progress into major shock, requiring more or less heroic combative measures.

If we summarize the most important factors producing shock before, during and after an operation, they are: dread or fear of an operation; a prolonged and weakening preparation; a badly administered anesthetic; cutting of unblocked nerve structures; loss of blood; rough handling of tissues, particularly visceral; prolonged anesthesia; pain, nausea and vomiting after operation. If we can eliminate these factors, we can do shockless operations.

The fear of an operation is largely a matter of previous personal experience on the part of the patient, or it has been transmitted to him by some one else who has "been through the mill" or has heard that "Mr. Jones nearly died on the operating table" or what not. A study of the psychology of the patient and confidence in the skill of the operator will do much to lessen fear, while the administration of an opiate shortly before the operation will reduce the activation due to the fear impulse.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, June 21, 1915.

The routine preparation of a patient for an operation is now fairly well standardized and drastic purgation is no longer the rule, so that this shock-producing element is seldom a factor.

A badly administered anesthetic is certainly productive of shock—rapid and irregular alternations in the gamut of anesthesia from semi-consciousness to profound anesthesia are a menace to the welfare of a patient, which the trained anesthetist does not permit. The undue prolongation of an anesthetic is the fault of the surgeon, who in his zeal to do all the surgery the case demands, some times doing too much surgery, does not take into account the bad effects which may follow a long anesthesia. Chloroform and ether cause a loss of hemoglobin and may cause pulmonary, renal and hepatic changes. All the general anesthetics cause an acidosis of greater or less degree. Nitrous oxid and oxygen cause no tissue changes and is the safest anesthetic in skilled hands we have. It does require a particularly trained anesthetist, it is expensive, the requisite apparatus is cumbersome and the anesthesia is too light except with the coincident employment of local anesthesia—in other words, nerve-blocking.

Loss of blood is a very important factor in shock production, but it is usually within the control of the surgeon, if he knows his work.

Rough handling of the tissues is greatly to be deplored—it tends to devitalize them and in the case of most of the viscera it produces shock very quickly.

Crile's aim therefore has been to avoid all these shock-producing factors or, as he terms them, the noci or harmful ceptors and to employ only the bene or harmless ceptors. This has been my point of view ever since I began to seriously study the subject, and I must confess that I shudder to think of many of my pre-anoci operations. To deprive me of the opportunity of doing operations with anociation would be worse than depriving me of a telephone—the latter is a convenience and a time-saver, the former a shock and often a life-saver.

The technic we employ is briefly stated as follows: First to gain the confidence of the patient and to make such explanation of the proposed operation as seems wise; the skin, bowel and other preparation to be governed by the nature of the case; a hypodermic of morphin gr. 1/6 and scopolamin gr. 1/200 given 1½ hours before operation and in the case of alcoholics a dose of 1 to 2 ounces of whiskey an hour before operation; anesthesia with nitrous oxid and oxygen; infiltration of the field of operation with novocain ¼ per cent. This nerve-blocking should be done carefully and thoroughly in order to abolish all pain impulse and not upset the even tenor of the anesthesia. When the incision has been made the whole area, with the exception of the skin, is further infiltrated with a 1 per cent. solution of quinin and urea hydrochlorid, which continues its analgesic action for 24 to 72 hours—the analgesia of novocain lasts half an hour. The rest of the operation is carried out with due regard to hemorrhage and traumatism.

From my limited observations of other surgeons carrying out this technic, I believe that non-success in operating under nitrous oxid and oxygen without the addition of ether is generally due to insufficient local analgesia, fearing toxic symptoms from the novocain or quinin and urea hydrochlorid. There are a few cases of poisoning by novocain on record, but so far as I have been able to ascertain it was always combined with epinephrin and the injections had been made in the gums. According to the literature as much as 7½ grains can be safely used, and I know of one case in which 42 grains were injected by mistake without any toxic symptoms supervening. Quinin and urea hydrochlorid has been injected intravenously to the amount of 100 grains in 24 hours, so that it can be considered practically non-toxic. As I employ not to exceed three grains of novocain and six to eight grains of quinin and urea hydrochlorid, I feel well within the limits of safety. I have not seen any toxic symptoms to be ascribed to either drug. It is to be remembered, however, that occasionally quinin and urea hydrochlorid when injected into the skin will produce necrosis, hence it should always be injected subcutaneously.

We have yet to acquire a technic which will produce visceral analgesia, particularly in the abdomen. All the abdominal viscera are insensitive to cutting operations, but traction on the mesenteries produces cramp-like pains, which can be avoided by gentle manipulations. Anyone who intends to take up this line of work should familiarize himself with the varying degrees of sensibility exhibited by the various body tissues. Bloch and others have made very careful studies of this question.

Post-operative pain following a well conducted anoci operation is very much less than I have ever seen under the older regime. A most striking result is obtained in rectal operations, for example, the ligation of hemorrhoids. Such patients, who usually suffer intensely, are, under the influence of quinin and urea hydrochlorid kept free from pain for the first two or three days—in fact they scarcely know an operation has been performed. Abdominal cases have fewer complaints after anociation, for with a persisting analgesia of the muscles and particularly the peritoneum, the so-called "gas pains" within the first twenty-four hours are almost a thing of the past.

Post-operative nausea and vomiting are decidedly lessened by gas and oxygen anesthesia—lavage of the stomach is seldom done, except after some stomach operations.

The use of stimulants and subcutaneous or intravenous salt solution injections has been practically abolished in my operative cases, except in those cases already previously reduced through disease or accident. When possible a preliminary direct transfusion of blood is given in desperate risks and further stimulation is seldom needed.

After an experience with 1,200 operations done under anociation, the great majority of them being major operations, I am convinced of the following conclusions: Pre-operative fear can and should be minimized by the tactful surgeon and the anesthetist, thus doing away with psychic shock; operative shock does not enter as a factor in the vast majority of operations done under anociation: the margin of safety is so much conserved by anociation that desperate risks do not look so formidable: that nitrous oxid and oxygen is a very safe anesthetic when properly given: that novocain and quinin and urea hydrochlorid are harmless in ordinary dosage; that the post-operative comfort of patients has been very greatly improved and that the mortality rate of operations has been reduced by anociation.

NITROUS OXID-OXYGEN ANESTHESIA.*

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Any discussion of the merits of nitrous oxid before a gathering of anesthetists would seem an unnecessary insistence upon the obvious, were it not for the fact that there are still a doubting few; and until all anesthetists recognize and express the great advantages of nitrous-oxid-oxygen anesthesia, surgeons will be reluctant to give up the older methods.

Its administration demands more skill and entails greater effort on the part not only of the anesthetist but of each member of the surgical team than any other method, and many operators are still unconvinced that the patient reaps proportionate benefit.

In the Presidential Address to the Anesthesia Section of the 17th International Congress of Medicine, Dr. Dudley Buxton declared it to be *"a sign of progress in the subject of anesthetics that we no longer limit our purview to the task of making the patient unconscious of pain. To fulfill our ideal we now strive to limit the action of the drug or drugs, which have been selected after careful study of the patient and the surgical requirements; to limit it so that no deleterious after effects shall ensue, and that no interference with normal tissue recuperation shall arise."*[1]

In making the selection of an anesthetic to meet these requirements, nitrous-oxid-oxygen would more nearly justify its choice in a very large majority of cases than any of the other agents at our command.

In spite, however, of the mass of experimental and clinical evidence in its favor produced by Crile and others it is not used as extensively as its merits would justify. Many surgeons who have proven its superiority for all operations where any danger is to be apprehended from the anesthetic do not use it as a routine procedure.

Conclusions drawn from five years of progressively increasing opportunities for the administration of nitrous oxid, as compared with fourteen years experience with ether, prompt the presentation in this paper of some of the points of superiority of nitrous oxid, with the probable reasons for its slow acceptance, and the suggestion of methods for increasing its field.

The definite requirement that an anesthetic agent shall neither produce nor assist in the production of shock is met by nitrous oxid.

While the explanation of the production of shock is still a matter of investigation and discussion the results obtained in its prevention by the use of nitrous oxid is a clinical fact. The various conflicting views on this subject have in no way influenced the findings of the experimenters who have investigated its relation to anesthetics, in almost universally declaring that nitrous oxid alone or with a minimal amount of ether is least apt to aid in its production.

With Crile's theory that shock is the result of the exhaustion of brain cells, from injurious afferent impulses caused by emotional and traumatic stimulation, nitrous oxid anesthesia is a necessary link in the chain of anoci-association which is further strengthened by the preliminary narcotic and the progressive use of local anesthetics.

Henderson finds that shock is the result of a definite sequence of events instituted by abnormally excited breathing, causing reduction of the store of carbon dioxid in the body, with subnormal respiration to the point of cyanosis, and partial or complete asphyxiation during the resultant compensatory period of reaccumulation.[2] It follows as a logical conclusion that nitrous oxid, by eliminating the stage of excitement and consequent overventilation, prevents the train of events leading to acapnia.

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*Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, June 21, 1915.

Frank C. Mann, of the Laboratory of Experimental Surgery of Indiana University, finds the cause of shock to be "the tremendous loss of red cells and fluid from the blood, due to the reaction of the great vascular splanchnic area to irritation, an acute inflammation of the peritoneum due to trauma and exposure to the air and changes of temperature. Certain accessory factors which help to produce the condition of shock are muscular relaxation, decrease in intra-abdominal pressure and impaired respirations, all of which tend to decrease the amount of blood returned to the heart."[3]

Applying this theory Gatch declares that during a prolonged period of complete muscular relaxation, so much blood may be withdrawn from the circulation in the valveless abdominal veins, which the vasomotor mechanism is unequal to preventing, that all the tissues suffer from the diminished blood supply, and that therefore operating for ten minutes under profound anesthesia may do the patient more harm than operating for an hour under light anesthesia.[4]

Ether anesthesia may be light enough to fulfil this requirement, but unless some such method as Connell's be used, where a definite known tension is maintained, the tendency is to give more ether than is necessary.

That there are periods in most operations, when no anesthetic is required has been proven by discontinuing the administration during the stages of the operation when no stimulation of reflexes is being produced by the operator's manipulations; perfect relaxation and unconsciousness have been maintained for long periods—in a personal experience for sixty-seven minutes during an etherization of two hours.

In the Mayo Clinic the routine procedure of discontinuing the administration of ether, in the gastroenterostomies and intestinal anastomoses during the interval between the location of the field and the abdominal closure also demonstrates this fact.

Because of this frequently unrecognized possibility of the discontinuance of the anesthetic for long periods and the prevalent idea that deep anesthesia prevents shock, the majority of patients are given more ether than is necessary.

Some recent experiments of Crile in determining acidosis by estimation of the H-ion content of the blood, tend to show that acidosis is increased during deep anesthesia and that therefore only the lightest degree, such as is produced by nitrous-oxid-oxygen, should be used in cases where it is present or threatened.[5]

The possible ill effects of ether, immediate and remote, are so well recognized as to need no comment, and all of the evidence tending to show the dangers of deep anesthesia are arguments for the employment of nitrous oxid. The best results are undoubtedly obtained when it is used in conjunction with anoci-association. The preliminary narcotic and the surrounding of the patient with every possible device for allaying fear are essential to successful anesthetization whatever the agent or method employed. Local anesthesia has long passed from the stage of experimentation, and has been accepted in a large field of surgery as superior to ether from every standpoint except the psychical one. Were it not for this factor and the danger from sepsis in invading the spinal canal, intraspinal cocainization might have superseded inhalation anesthesia. Even if the deep anesthesia produced by 50 to 52 m.m of ether tension in the central nervous system is capable of protecting the central nerve cells from traumatic afferent impulses, this result may be achieved with far less risk to the patient of post-operative complications, by a combination of preliminary hypnotic, local analgesia and nitrous-oxid-oxygen, supplemented when necessary by 15 to 25 m.m. ether tension, producing the condition which Connell designates the most advantageous of all anesthetic states.[6]

The limited use of nitrous oxid is due mainly to three factors: (1) the dearth of skilled anesthetists, (2) the cost of the gases, and as a necessary consequence of these two, (3) the lack of opportunity for many surgeons to test its efficiency.

Cunningham says: "The extent and distribution of the use of nitrous oxid and oxygen for surgical anesthesia is the same as the number and distribution of skilled anesthetists."[7] The special training necessary to administer this anesthetic is difficult to obtain, the cost of the gas prohibiting its use in all but a few of the teaching clinics. This difficulty may be overcome in the future by the equipment of hospitals with plants for the manufacture of nitrous oxid. There is a great need of provision being made in the post graduate schools for instruction in this branch of medicine and it would seem to be within the province of this association to aid in securing it. Cost of the gas is the factor which has more than anything else retarded the appreciation of its value, but since the demonstration by Haldane, Henderson, and their collaborators of the respiratory stimulation of carbon dioxid and its practical application in rebreathing, the number of gallons per hour found necessary to maintain anesthesia has been much decreased.

The cost is further indirectly compensated for by the reduction in the period of hospital care due to the more rapid convalescence when unretarded by nausea and consequent starvation.

Insufficient muscular relaxation is not only the chief objection made by the surgeon, but also the main difficulty encountered by the anesthetist in administering nitrous oxid and oxygen. It is always possible to control or modify muscular tension by the addition of ether, and if there is the proper cooperation on the part of surgeon and assistants, the amount may be so small as to produce no systemic effects, and the patient awakens at the close of the operation to full consciousness as though no ether had been used.

Among the means of securing a smooth and satisfactory anesthesia with nitrous oxid, the most important is the cooperation not only of the surgeon but of the assistants and nurses with the anesthetist. The necessity for absolute quiet during the induction period; the avoidance of too vigorous preparation; gentleness in placing the patient in position—a sudden flexing of the thighs in securing the lithotomy position, for example, may produce more reflex stimulation than the initial incision—refraining from exerting sudden or unnecessary force in retracting and sponging; care in preventing over-heating of gauzes used in the peritoneal cavity,[8] and most of all, avoidance of pressure exerted posteriorly on the abdomen, especially when distended intestines are walled off with gauze, or with the patient in the Trendelenberg position, are points of the utmost importance in assisting the anesthetist to obtain the best results.

Semi-transparent gauze shields, instead of opaque material between the operative field and anesthetist, permitting the latter to anticipate the operator's need for a deeper degree of anesthesia during certain phases of the operative procedure, are an advantage.

In the last 627 cases (exclusive of oral operations) anesthetized for forty surgeons only 14 per cent. were etherizations; nitrous-oxid-oxygen with varying amounts of ether averaging 30 grammes were used in 28 per cent. and nitrous-oxid-oxygen without ether in 58 per cent.

The testimony of surgeons who have accustomed themselves to operate with nitrous-oxid-oxygen, that their technic is rendered more accurate, that the patient's condition, as regards immediate and end results, is immeasurably better, and that the margin of safety is so much wider as to permit of operative interference in many cases formerly considered impossible risks, would indicate that nitrous-oxid-oxygen will eventually supersede to a large extent the older anesthetics.

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THE USE OF NITROUS OXID AND OXYGEN IN OBSTETRICS.*

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The modern surgeon is performing miracles on the human body second only to those performed by the Great Physician during His sojourn on earth.

These marvelous results have been made possible by the discovery of methods whereby pain has been banished. So thoroughly has this been accomplished that a person preparing to undergo an operation at the present time has very little if any thought or fear of pain during the operation.

Great as has been the scientific progress of surgery and medicine, and the scientific progress towards the elimination of pain, there has until recently been very little accomplished for relieving woman in her hour of greatest trial and triumph.

Numerous methods for relieving the suffering incident to childbirth have been tested and although there are a number of therapeutic agents effective for this purpose no method until recently has been developed that was devoid of all danger to mother and child.

Fortunately for motherhood we do not live in an age of religious fanaticism and superstition, although we still have a few professional men who are suffering from inertia of the mind and who refuse to progress with the advances made in science.

When any new method of treatment is first introduced it is expected that more or less sharp criticism will be forthcoming, especially if the treatment should differ radically from the usual routine and accepted standards.

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* President's Address: Third Annual Meeting, American Association of Anesthetists, San Francisco, Cal., June 21, 1915.

"Everything new is received with contempt, for it begins in obscurity. It becomes a power unobserved."

As a profession whose aim is the alleviation of pain and prolonging of life, we should withhold criticism until the new means or method has been proven wrong, not as good, or no better than those already in use.

Those who are familiar with the history of medicine are aware of the opposition to inoculation and vaccination, and to the use of cocain nad quinin; even today we find medical men writing prescriptions who do not believe in germs; and last, in our generation, we meet with a determined opposition to the use of general anesthetics—the greatest blessing to mankind. At an early age there were attempts made to relieve the pain of childbirth, for history records that in 1591: "A lady of rank, one Enfame Macalyane, was charged with seeking the assistance of Agnes Sampson for the relief of pain at the time of the birth of her two sons; she was accordingly burned alive on the Castle Hill of Edinburgh."

Sir James Y. Simpson of Edinburgh, and many men of this country used ether and chloroform for this purpose, soon after their discovery in 1846 and 1847, despite the opposition of the church and profession.

It was found these agents were not free from dangers to both mother and child when administered throughout the period of parturition and the use of these at the present day in the hands of the conscientious obstetrician is usually limited to the last stages of labor.

About thirty-five years ago, morphin was used hypodermatically in large doses to relieve pain during the first stage of labor, but owing to many instances of injury to the child it was abandoned. In 1902, Von Steinbuchel of Graz, introduced into obstetrics the combined use of morphin and scopolamin. This combination has been used extensively both in Europe and in this country, and after a few years' trial was almost discarded, having been found to be dangerous.

New interest was aroused when Gauss of Freiburg, in 1906, published a report of six hundred cases in which these drugs were administered to relieve the pains of parturition. In 1912, Gauss again called the attention of the profession to the value of these agents when properly used, and reported having used them successfully in over five thousand cases.

It is generally accepted today that with morphin and scopolamin the technic which gives the most satisfactory results is the one perfected by Prof. Gauss, and named by him *Dammerschlaf* or *Twilight Sleep*. The English term of *Twilight Sleep* is a paraphrase, and has been used indiscriminately by physicians in describing the analgesic or amnesic state during labor regardless of technic, or therapeutic agents used. I agree with Knipe, "That inasmuch as the word 'Twilight Sleep' was coined by Gauss to represent a condition induced by the Freiburg method, no one has a moral right to use the phrase loosely as applied to any method of giving scopolamin and morphin."

Prof. Gauss' method has received world-wide attention, not only among the profession, but the laity, and the term *Twilight Sleep* has become almost a household expression; the latter fact being responsible, I believe, for the testing of this method by so large a number of men in this country.

There are numerous articles on the subject. Such men as Horan, McPherson, Rongy, Beasle and Knipe have studied the method, and although there is, at present, a division of opinion regarding its merits and demerits, some modification of it will, in the future, undoubtedly, prove not only more efficient but safer in a larger proportion of cases.

Rongy states "That in order to derive all the possible advantages from the Dammerschlafen method it must be practised very cautiously, and its use adopted only in selected and suitable cases. It has now no place in short labors, thus eliminating the majority of multiparae." Therefore, we see that the greater number of prospective mothers must look forward to the development of other methods, applicable to all, or accept the errorless teaching of Christian Science.

I wish to present for your consideration a method which I believe to be more efficient, less dangerous to either mother or child, and which possesses greater possibilities than any method heretofore presented. This method is N_2O-O analgesia.

Nitrous oxid and air, or N_2O-O has been used in labor for a number of years as an anesthetic in place of ether or chloroform, but its application was generally confined to the last stages of labor. During the past ten years a few of us have been using continuous analgesia with N_2O-O during labor. My first case was in my own family, July, 1905; the results were most gratifying, and later experience has convinced me that this method has distinct advantages over all others. I have used N_2O-O analgesia thousands of times in dental surgery since 1902, and have met with no symptoms that would contraindicate its successful use during labor. In fact I do not hesitate to prophesy that this method will eventually, practically supplant all others for this purpose.

Anticipating the question that this method requires special apparatus, special instruction and a general knowledge of anesthesia, thereby making it impracticable for general use, I would answer as follows: Granting that these requirements are essential, is it not true that the medical man who has not only the desire to advance in his work, but who also has the welfare of his patient at heart, will not term as difficult the method which is generally conceded to be the most efficient, and which produces the best results?

Thousands of dentists in this country have become expert with the N_2O-O analgesia with the result that pain has been almost eliminated from operative dentistry, and a few years hence painful dentistry will be a thing of the past.

The technic involved in the use of N_2O-O during labor while somewhat exacting and a matter of considerable detail, is one that may easily be mastered by every good anesthetist and obstetrician. At the present stage of the use of N_2O-O in obstetrics, it should be attempted only by those familiar with its physiological action and its peculiar properties. Many hospitals are already suitably equipped for the successful development of this method, and where, through clinical observation, the maximum efficiency may be obtained. It will require some time for N_2O-O analgesia to become thoroughly understood, and made practical for general obstetrical purposes. In November, 1914, we established this method in the obstetrical division of St. Luke's Hospital in Cleveland, and up to the present time our results have been most excellent.

From the experience I have gained in the past fifteen years in administering N_2O-O in major surgery, in the analgesia cases I have had during the past thirteen years in operative dentistry and in the limited number of the obstetrical cases I have had in the past nine years, I can say without reserve that there is no danger during the analgesic condition or state to either mother or child, and it may be used without increasing the danger even in the most critical cases. Threatened eclampsia, hemorrhagic conditions, lung, heart, or kidney complications do not in the least contraindicate its application. It must be borne in mind that I am referring to the condition or state of analgesia as produced by N_2O-O and not the anesthetic state.

As Hewitt states: "Analgesia is a condition where the sensibility of the receptive sensory nerve-endings is destroyed; accompanied by an incoordinate subconscious mental state; while the power of appreciating pain is absent, tactile sensibility and all the functions are preserved."

Claud Bernard claims that through the action of the agent on the sensory centers of the cerebrospinal axis, analgesia is brought about when inhaling an anesthetic agent. The sensibility of sensory nerve-endings is destroyed from its action upon the centers themselves and not from the action of the anesthetic upon these endings. Dastre believes that "analgesia depends upon the sensory nuclei of the cord or cerebral ganglia being affected by the anesthetic agent before the cortical centers, so that sensory impressions are blocked on their way to the receptive areas of the cerebrum"; others, however, believe the block takes place in the cerebral cortex.

The symptoms of analgesia are first a peculiar pleasant feeling of numbness in the extremities, which soon encompasses the entire body. The mental condition is usually first stimulated so that the patient is in a happy, care-free frame of mind, resembling a pleasant state of intoxication. As analgesia is deepened there will be excessive ideation, disturbances of judgment, control and volition, vertigo, loss of power of maintaining equilibrium, misinterpretation of external impressions, loss of power of remembering sensory impressions. In a large percentage of cases under continuous analgesia there will be a diminution of common sensibility to a great extent. The mental condition of the patient before and during the application of the method influences the success of analgesia to a much greater extent than in anesthesia, as it must be remembered that in analgesia the patient is conscious of surrounding conditions and shows a disturbance of judgment and control. It, therefore, is essential to inspire the patient with confidence. Suggestion and moral suasion are highly important factors in the success of analgesia. It must be remembered that when strong mental impressions are produced from any cause, results will follow.

Another element essential to the success of this method is the isolation of the patient in a quiet room with a subdued light in so far as this is possible, to prevent such disturbances to and conversations with the patient.

Technic: Unlike *Dammerschlafen*, N_2O-O may be given successfully during any stage of labor, and the amount may be increased or decreased as conditions indicate. The proper time for administering is near the beginning of the second stage, when about two or three fingers breaths dilatation of the os is present, and the pains are taking place every five or six minutes. However, it may be administered sooner, if the pains are well established and are quite severe. Unfortunately, there are women who are so imbued with the idea that all pain must be absolutely eliminated from the very beginning, that they insist upon being placed in a state of utter oblivion to their condition regardless of consequences, and will deliver a scathing denunciation of all concerned, not only at that time but ever after, if their request be not granted.

The apparatus necessary for this work need not be cumbersome, nor complicated, but must be one that will deliver the gases in continuous and accurate amounts of air. The *nasal inhaler* may be used, or, the *face inhaler* may be preferred in order to allow the patient to breathe through the mouth as well as the nose. When the pains are intermittent the best method to employ will be to allow the N_2O to flow at the rate of about eighty (80) gallons per hour and the O 15 gallons; in addition have the air valve partially open. Instruct the patient to inhale deeply three or four times when she anticipates the approach of a pain. This amount will usually insure a satisfactory degree of analgesia, which may be maintained throughout the contraction by turning back the N_2O to 40 gallons per hour, the O and air valve remaining as before. When the contraction ceases, remove the inhaler and stop the flow of the gases. This is repeated until the actual labor pains are taking place every three or four minutes, and the cervix dilated two or three finger breadths. From this time on until the actual delivery of the child, continuous analgesia is necessary. The nasal or face inhaler is continuously applied and the N_2O allowed to flow at about 40 gallons per hour, and the O at about 15 to 20 gallons per hour, whilst the air valve is left wide open. The patient will increase her tidal volume greatly, preceding and during the forepart of the pain thereby deepening analgesia.

It will not usually be necessary to alter the percentage of gases or air that are being given, for the increased tidal volume will increase the amount of rebreathing, thus intensifying the degree of analgesia. During the major part of the pain the tidal volume will be lessened owing to the patient holding her breath while straining. At the completion of the contraction, respiration becomes quiet and regular and the patient will appear as if asleep or lightly anesthetized. It is impossible, however, to produce true anesthesia with this percentage of N_2O and the patient may be aroused at any time by speaking sharply to her, upon which she will respond to questions; or perhaps ask for a drink of water, which may be given. At the approach of another contraction the patient will begin deep breathing unless too much N_2O has been given, in which event ascertain if the patient be conscious. Should she be, and is not suffering, all is as it should be. If she be suffering instruct her to breathe deeply as above. If she does not respond when spoken to, she has passed into anesthesia, and this condition must be remedied by giving less N_2O and more O and air. Analgesia and not anesthesia is the condition to be maintained during this stage.

When the head is on the perineum, it is generally advisable to carry the patient into a light anesthetic state, although many cases will go to complete delivery during analgesia without appreciating any pain. If necessary to carry the patient to light anesthesia, allow about 80 gallons of N_2O per hour to flow and 25 gallons of O, closing off the air supply. This will maintain only light anesthesia, and all danger of cyanosis will be eliminated unless there is obstruction to breathing, or a low percentage of hemoglobin. In any event, the oxygen supply should be sufficient to eliminate the possibility of intercurrent asphyxia. The patient must be kept pink at all stages, and plenty of oxygen will produce this condition. The child will be born pink, and will cry spontaneously and lustily, and will not begin life with the handicap of having to eliminate toxic drugs from its system. Oligopnea is never present, nor is apnea, unless there has been some complications in the delivery, such as cord around the neck, or a constricted pelvis producing a prolonged retention on the perineum. When the child is delivered the N_2O is discontinued and pure O given for about a minute, when the inhaler should be removed. The mother will then immediately regain control of her mental faculties and show interest in her surroundings. If severe pains are experienced in expelling the placenta, analgesia may be reestablished, the technic being the same as used in the first stage. Should it be necessary to manually extract the placenta, light anesthesia may be quickly induced and upon the completion of the removal of the placenta, the gases should be discontinued. Continuous analgesia as used in the second stage of labor, should be maintained if necessary for the repair of lacerated perineum. This will usually be sufficient to relieve the patient of pain during this surgical trauma.

Frequently there is a certain state of intoxication encountered that may continue for some little time, and during this condition of an unstable and stimulated mind, the patient may make resolutions which friends should not regard too seriously. For instance, under the old method of leaving nature alone, and after hours and perhaps days of suffering, both father and mother would say "this will be the last one" but under the newer painless method, they will be quite ready to abandon any idea of race suicide.

There may be some danger of retarding labor during the first stage if the method be applied too soon, or the analgesia be too deep; but uterine inertia has never occurred in any of our cases, nor has this stage been prolonged. The second stage is materially shortened, the uterine contractions are seemingly stimulated and as the objective pains are not appreciated, the mother assists nature by her expulsive efforts to a greater degree than when racked by birth throes. In some of our cases labor was progressing too rapidly, and we were fearful lacerations would result, unless labor was retarded. This is quickly and easily accomplished by deepening the analgesia, and this may be carried to the extent that all efforts of expulsion on the part of the mother will cease without interfering materially with the uterine contractions.

The most pleasing and satisfactory feature of this method, and one, I think, which will make it second to none in this respect, is the absolute control which the administrator has of it, at all times. The patient may be carried from full consciousness to deep anesthesia, brought back to light anesthesia or analgesia in from thirty to sixty seconds without injurious effect upon either mother or child, and in from one to two minutes the agent may be entirely eliminated, and the mother left in a perfectly normal condition.

Occasionally cases are observed where mental and physical excitement will occur, especially in a hysterical or an unstable mental condition, or among the ignorant class. Here is where the power of mental suggestion should be exercised to the limit. If the patient does not respond well I induce light anesthesia (if the patient is in the second stage of labor) and maintain it for ten or fifteen minutes, after which I bring her back into the analgesic condition. I have never experienced any further trouble in such cases. If hysteria or excitement occurs during the first stage, I discontinue administering the agent and endeavor to control this condition by administering a sedative, such as morphin, in small doses. If morphin is used in this connection ⅛ grain may be given, and this dose repeated in half an hour if necessary.

The stages of analgesia cannot be produced with the same degree of certainty and exactness as the anesthetic stages. However proficient one may become in establishing and maintaining analgesia there will always be a few cases where it is impossible to secure complete insensibility to the uterine contractions, or subjective pains. It should be remembered that deep analgesia is accompanied by a certain amount of amnesia, therefore, the contractions of the uterus may evoke responses which have all the appearance of, and in one sense *are* conscious responses, but owing to the lack of synthesis in the sensory impressions received, and to disturbances within the receptive centers themselves, pain is either not appreciated as pain, or if appreciated is not remembered.

We must constantly bear in mind the fact that in order to secure satisfactory results with this method from the second stage of labor, that an even and constant uninterrupted stage of analgesia must be maintained. This is as important as the maintaining of an even anesthesia. Any deviation from this will invariably lead to undesirable results.

A definite and even state of analgesia is possible only when the gases are given in exact and continuous dosage. "If an attempt be made to regulate the dosage by the reaction of the individual, uniform results cannot be achieved, nor can methods be standardized." It is not my aim to declare that in this method we have a panacea for all the suffering in all obstetrical cases. As yet this method is only in its infancy, and it will only be by continued experience we will learn what modifications are essential to produce a uniformally successful and practical method. The appreciation and enthusiasm of the mother after travail, where the N_2O-O analgesia method has been used, are so great and sincere, that one feels that all efforts expended along this line are well worth while, and a renewed inspiration is given each time to endeavor to bring it to a more perfect and complete state in order that all mothers, regardless of class, may enjoy its blessing.

While some writers condemn any method whereby pain is eliminated during childbirth, advocating that it is for the woman to endure her suffering with fortitude at this time, we should remember that nature did not intend that the bearing of children should be attended by extreme suffering. It is only where civilization and her customs have developed a highly sensitive and physically weak race, that woman must endure intense pain and subsequent shock. "The same refinement that brings us new pleasures, exposes us to new pain," therefore, if her suffering has been brought about by the advancement and progress of a refined and cultured race, why then should we not continue to advance to meet the condition?

Is the man in the trench, shattered by the bursting shrapnel, any less the soldier because he blesses the hand that administers the anesthetic which gives relief from his pain? Certainly not; an irresistible demand lies before us for relief from suffering during labor, and it is the duty of the medical profession to furnish it. Our efforts may not at first be entirely successful, but in the words of Henry Ward Beecher:

"We should so live and labor in our time that what came to us as seed may go to the next generation as blossom, and what came to us as blossom may go to them as fruit. This is what we mean by progress."

ROSE BUILDING.

DISCUSSION.

DR. CARL LESLIE HOAG, San Francisco: As has been brought out in Dr. Botsford's paper, the principal objection to nitrous oxid anesthesia has been the lack of muscular relaxation, and on this account many surgeons have objected to it. In obstetrics the only objection I can see is that under its influence the dilatation of the perineum will not be so complete as can be produced under chloroform or ether anesthesia. We can draw the conclusion from this that the number and degree of lacerations of the perineum under nitrous oxid would be greater, and to that we must give a certain consideration. But just as local anesthetics have met with enthusiastic success in surgery, so it may be that the application of nitrous oxid will be the anesthetic of choice in labor. On April 11 of this year I confined a woman, Mrs. M. T., a primipara, applying nitrous oxid as Dr. Teter has indicated and with Dr. Teter's apparatus. The progress was satisfactory. First the head came upon the perineum. I turned back the vulva edges and injected the perineum very thoroughly with novocain; the perineum then dilated without the least sense of pain and the head was delivered without any lacerations other than very slight mucous ones. I regard novocain as having produced this result. The striator muscles I regard would have been much more tense if local anesthesia had not been employed. I think we can employ the same practice as Crile does in surgery, of combining nitrous oxid analgesia with the local injection of the perineum. As Dr. Terry has brought out, the effect of novocain is transient, but one of two things may be done to prolong the effect, either the perineum may be reinjected, or quinine urea may be used. I have seen this done. I have never seen any ill results from Dr. Teter's method; I have never seen hematosis and there has never been one case of infection, and I see no reason why this cannot be employed successfully in obstetrics. Whether injection of the cervix will prove valuable I think is questionable. It would introduce a larger chance for infection, and I think until we find out more about it this is unwise. The effect of the novocain upon the fetus I think very important, but the quantity used is very small and the opportunity for this observation is so limited that I think it would be a minimum risk. Besides, this would not be greater than the opportunity for toxic effects of novocaine when employed where Cæsarian section has been done under local anesthesia.

DR. CARL G. PARSONS, Denver, Colorado: Just before I left home I gave gas and oxygen for a serious abdominal operation. The woman had been previously operated in San Francisco in 1902 for appendicitis and removal of the ovaries. It was said the ovaries were removed, but they had not been removed. Then she was operated for gastroenterostomy under gas and ether, and had an awful time afterwards. Later she was operated under gas and oxygen and anoci-association by one of the best men in our town and she did not have any trouble afterwards and was out of the hospital in about two weeks or so. The men who are able to produce anoci-association (in the United States) are very few, that is, those who do it properly. There is quite a technic and it needs lots of study, as a very rigid attention to details is necessary.

DR. J. M. WAUGH, Hood River, Oregon: These three papers cover a very important field and they are closely related. In the first place, discussing Dr. Teter's paper, it has always been a question in my mind why the public did not appreciate the fact that the obstetrical case is a surgical one from beginning to end. It is not a medical case. No surgical operation is performed, but anything that comes up in the way of abnormal conditions is of a surgical nature. The methods that tend to reduce the traumatism of obstetrics—analgesia or anoci-association—are methods that in their essence must mean a man's getting full control of the basic knowledge of anesthesia and of surgical practice. You cannot say that every physician in town or country who confines a woman in a home will carry out analgesia successfully. Some men can because they will understand it; but another large group of men will buy the apparatus and try it out in a home unsuccessfully, and it will be cast aside. The country has gone "daffy" in a sense over Twilight Sleep, and Twilight Sleep in its original conception will not exist very long, I think. The great advantage of this method advocated by Dr. Teter is the fact that at no time is your patient out from under your control. If you inject scopolamin, or morphin and hyoscin, or anything of that kind, into a patient's system, you have lost control and you cannot get it back in a few minutes. Whether it is successful or unsuccessful, the anesthetist should have control of the patient. I want to relate one case that occurred recently. This was a woman who had been confined two years previously and had been extensively lacerated and had had a great deal of surgical repair that resulted in a lot of scar tissue in the cervix. When she came to the hospital I accepted her with some reservations because I felt there would be trouble. She had also had an abdominal operation for shortening of the ligaments. She started in labor, and after getting a dilatation of about two fingers I started nitrous oxid analgesia. She continued in that condition for sixteen hours without getting more than three fingers dilatation. She was not given it continuously throughout all that time, but whenever the pains came on. At the end of that time, knowing that if I interfered from the vagina it would mean a reproduction of the original laceration, which would mean the second repair of lacerations, I advised the Cæsarian section, which was accepted and I performed the operation. Some say, "What did you gain by the nitrous oxid-oxygen?" I gained this—that after that length of time I still had a patient not exhausted. Sixteen hours of difficult labor and excitement would have given me a patient tired out, and I would have undertaken the Cæsarian section under grave apprehension. So I gained success even though I was unable to assist in the dilatation of the cervix by nitrous oxid. I want to ask Dr. Terry—I think I am correct—if Dr. Crile refused to use urea hydrochlorid in pus cases—as the breaking down of the tissues is too extensive in these cases. At least two years ago he advised not to use urea hydrochlorid if there was any danger of a pus case.

DR. L. I. BREITSTEIN, San Francisco: I think as obstetricians we ought to apply the principles of anoci-association, and I have applied the same principle as we use in major surgery, that of injection of an alkaloid in many cases. I am not afraid of scopolamin. I have used it in cases here in San Francisco, and I start with the injection of one-sixth grain of morphin and 1/200 of scopolamin in the first stage. That will allay fear and also give you time to get ready for the nitrous oxid oxygen anesthesia. There will be an hour, to an hour and a half, when the patient will be in the first stage under this preliminary alkaloid, and will shorten the time of the nitrous oxid, and thus eliminate expense.. At the end of the first stage and through the second stage the nitrous oxid oxygen is administered, and when we come to delivery we have also had the same experience that Dr. Hoag has mentioned, that there is a lack of relaxation at the outlet. This can be overcome by the injection of novocain, ¼ per cent., or pushing the anesthetic with the addition of ether, and with both methods I have had very good results. I think by the use of scopolamin and novocain and by the greater use of nitrous oxid oxygen we will finally bring about painless childbirth.

DR. A. S. WAISS, San Francisco: I wish to add a few words to what Dr. Botsford and Dr. Hoag have said about a rigid perineum and os. The rigid perineum will be relaxed by injection, but the rigidity of the os can be overcome by painting with a ten per cent. solution of novocain. The fibers will relax and you will have an uneventful recovery where otherwise you would have a postoperative repair.

DR. M. J. LICHTY, Cleveland, Ohio: I have asked the Chairman if I might discuss this paper, and he said I might He has been a patient of mine, and he is afraid to deny me. I am neither an obstetrician nor a surgeon, and I would like to confine my remarks to anesthesia alone. The tenth time your Chairman gave nitrous oxid for analgesia in obstetrics was in his own home and I was the accoucheur. It was a joke almost. It was the first time I had seen it, but there has not been anything said about race suicide, pro or con, in that family since. Dr. Botsford has brought out one very good point which I must refer to and will add to it, and that is this. One of the objections to nitrous oxid is the expense, and the other is skill. But that should not stand in the way of the use of nitrous oxid. Expense must be met. There is nothing too good for life, and skill should be in command and demand. Now the third objection to nitrous oxid or a local anesthetic in obstetrics or anything else is the howling mob, and the way to subdue the howling mob is for the physician—obstetrician or surgeon—together with the anesthetist, to come right down on the patient and say: "This is my business and the public has no right to demand that an accoucheur or surgeon give a certain anesthetic, and run the job." As for me—and I believe Dr. Teter will agree with me—we have about solved the problem. Dr. Teter has given gas for hundreds of my patients; he has given gas to me. I had confidence in his technic and the belligerency in me subsided at once. I am sure that as years go by we will lose sight of two treatments, and the quicker we lose sight of them the better. One is Twilight Sleep and the other is anoci-association. This will come under Dr. Terry's paper. I enjoyed it fully as much as the other papers, and they have been helpful to me. I cannot agree with the anoci-association idea which is being heralded far and wide. I do not say this because Crile is not here, because he is a friend of mine. But let me refer to some of the detrimental things that occur at times. Infections have already been mentioned. One patient of mine demanded a certain surgeon because he knew his abdomen would be injected with some certain agent, and after the patient had gone to his home the surgeon went into his home and dressed the wound on the abdomen without the patient or physician knowing anything about it. That was local anoci-association. Another patient who needed a gastroenterostomy had all her arrangements made to have the operation; Dr. Teter was to give the gas, the surgeon was engaged, but this patient heard of a certain method by which there would be no pain and she would have relief three days thereafter. When I saw the surgeon a few weeks after, I asked him how that patient got along. "Oh, she died." I said: "She did not die of infection in the wound, she died of peritonitis." "Yes." "Because you stuck your needle into the mucosa and pulled it out and stuck it in again, and a nice peritonitis was the result." "Yes," he said, "that is what happened." I am not condemning anoci-association. If you can block pain by that method of anesthesia, do it; but do it right. I will repeat and say, settle this thing of the howling mob. Twilight Sleep and anoci-association is to quiet the patient, under supervision, so say to the people we are going to do this. But after all the Twilight Sleep and anoci-association are the work of the anesthetists, and whether it is anesthesia or analgesia, you men are the men to do it, and I congratulate you on the work you are doing.

DR. JOHN HUNT, Seattle, Washington: I just want to emphasize one point brought out by Dr. Botsford, and that is in routine anesthesia too much of the anesthetic is given It has been my observation that in cases with an extreme degree of shock we should take the ordinary precautions of giving a transfusion of saline solution and then the least amount of anesthetic possible to carry them through the operation. It seems to me that whatever is good for a case that is extremely sick is good enough for the case which is in a better state of health, and if this rule were followed in selecting the anesthetic there would be less number of cases go off the table that require a transfusion of saline solution. Another thing I have observed is that in toxic cases of goiter, in certain clinics that formerly used general anesthetics, they are now using novocain.

DR. WALLACE IRVING TERRY: I am glad to know that Dr. Lichty is not condemning anoci-association. It sounded very much like it. He has been unfortunate in seeing cases that have not done well. We have seen the same thing with other methods. We have made mistakes and have had bad cases. There is always the liability to err. I have been unfortunate in one or two of my cases. I had local gangrene in a skin case where I injected it with quinine and urea. I stopped using that and have not had any infection since. I did not know any better methods. I have had some cases, rectal cases, that have had pain after operation because I did not give my analgesia of quinin-urea at the right point. But we have had many more that have had no pain at all. I have never infected the perineum by pushing the needle through the mucous membrane, and I do not see how that is possible if a man understood the area that required analgesia. You can pick up the intestines and stomach and cut them without any anesthetic whatever. You do not need to inject them at all. I speak from an experience of three years with a lot of material and most varied material, and I am perfectly convinced of its efficacy if properly carried out. In pus cases it should not be used. Crile does not do it, nor do I. I forgot to put that in my paper, however. That correction should be made.

DR. MARY E. BOTSFORD: I have nothing further to say. The gentlemen discussed the paper very thoroughly. As to the gentleman who found so many errors, I think Dr. Terry has answered his objections—do it right.

NITROUS OXID-OXYGEN ANALGESIA IN MAJOR AND MINOR SURGERY.*

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The term analgesia has been so ill-defined and so often used in a vague sense that it seems advisable at the outset to have a mutual understanding as to its meaning. Analgesia is used to apply to both general and local states, but I shall refer to it as *that general condition produced by the inhalation anesthetics wherein there is insensibility to pain in which not all of the thought producing cells of the brain are asleep.* It corresponds more or less closely to the primary stage of anesthesia as defined by Gould in which he says: "Primary anesthesia is a temporary insensibility to slight pain occurring in the beginning of anesthesia and during which *minor operations* can be performed." I would add that *major operations* can also be performed in this stage and that the patient may not only be insensible to slight pain but also to severe pain.

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* Read before the New York Society of Anesthetists, November 15th, 1915.

Analgesia may be regarded as the half way stop between full consciousness and light anesthesia wherein there is absolute freedom from pain. All patients pass through the stage of analgesia, both in going under and in coming out of the influence of a general anesthetic, and while in this stage are capable of answering simple questions and complying with simple requests as only a part of the thought mechanism is anesthetized. The sense of pain and the power of memory of events occurring while in the state of analgesia are lost early, although the loss of memory is not a necessary requirement to insensibility to pain.

Hewitt has divided the phenomena of nitrous oxid anesthesia into three stages, the second of which, in part, covers quite well the term analgesia as I understand it. He says:

"There is loss of normal consciousness. Any injury inflicted during this stage may produce immediate reflex effects, but it would not be accurately remembered by the patient. Nitrous oxid is often accused of producing imperfect anesthesia because operations are sometimes commenced at this stage. Dreams are common but rarely distinctly remembered. The respiration is still quicker and deeper than normal and save for an occasional act of swallowing is perfectly regular. The pulse is still full and a trifle quicker than in the previous stage. The power of hearing may persist throughout this stage." These cover the analgesic points as classified in Hewitt's second stage of nitrous oxid anesthesia.

I would modify two of his statements somewhat by saying that in analgesia the power of hearing in a normal individual is always present and that the pulse rate usually decreases in frequency if the stage of analgesia is prolonged.

Stages of Analgesia.

Analgesia may be divided into three stages: light, medium and deep.

In the first or light stage there is insensibility to pain but the patient is sufficiently conscious to recall more or less correctly the events that occurred during the operation.

In the medium or second stage there is insensibility to pain with no recollection of events afterward but during which the patient was sufficiently conscious to answer certain questions and to comply with certain requests.

In the third or deep stage there is insensibility to pain, no recollection of events afterward and the higher thought centers too deadened to answer even simple questions or to comply with requests except that of opening or closing the eyes.

When the patient will not comply with this request, especially when it is reinforced with a light tap on the head with a finger it may be assumed that the sense of hearing is anesthetized and that the patient has left the realm of analgesia, and entered the state of anesthesia.

This rule, obviously, does not apply to those patients who are entirely deaf before the analgesia was begun. A few days ago I was called upon to administer nitrous oxid-oxygen analgesia to a deaf and dumb girl for an appendectomy. It was impossible for me to demonstrate that she was in analgesia by asking her questions. The rule that I used in this case was to administer the nitrous oxid sufficiently diluted so that the patient frequently opened and closed her eyes of her own accord.

Perhaps this is not always dependable evidence that a patient is in the state of analgesia but it answers quite well in cases of this character and also in those cases where the anesthetist does not care to make the tests by questioning his patient.

Also, if a patient laughs, cries, sings or utters connected articulate speech and at the same time is free from pain, I think he may be considered to be within the zone of analgesia.

Since the discovery of the action of the General Anesthetics, ether and chloroform have been used to a limited extent for their analgesic effects in obstetrics. Klikowitsch applied N_2O-O-analgesia to 25 obstetrical cases in 1880. The primary stage of analgesia has also been employed by some surgeons, for the removal of tonsils and adenoids and minor operations; but it has not been until recently that prolonged use has been made of analgesia. This the dentist first appreciated by the application of nitrous oxid-oxygen analgesia in painful dental work. Still more recently, that is, during the past two or three years, its use has been revived in obstetrics where, in my opinion it will eventually supplant the so-called *twilight sleep* produced by morphin and scopolamin.

The desire to determine what place, if any, nitrous oxid-oxygen analgesia has in general surgery prompted the writer to give it a thorough trial in both major and minor operations and for which opportunities I am indebted to the following surgeons: Doctors M. D. Mann, E. R. and F. W. McGuire, H. A. Smith, H. R. Trick, F. J. Parmenter, J. E. King, Thew Wright, Prescott LeBreton, W. W. Plummer, B. F. Schreiner, J. F. Fairbairn and C. M. Brown.

Advantages.

In the first place let us compare nitrous oxid with the other anesthetic agents.

It is generally agreed by those in a position to judge of the virtues of the various anesthetic agents that nitrous oxid is not only the pleasantest to inhale with fewer disagreeable after effects, but is the least toxic, and in the hands of the trained anesthetist the safest. Unlike chloroform, it is not a heart or circulatory depressant. Unlike ether it is not a lipoid solvent, is non-irritating to the air passages, and does not produce an excessive flow of mucous or saliva with their attendant evils.

It is rapid in its action and leaves the system quickly, when its administration is discontinued.

Its chief and perhaps only danger, if pure gases are used, is that of asphyxia.

With nitrous oxid-oxygen analgesia this danger is eliminated as a large percentage of oxygen is constantly administered. In the average nitrous oxid oxygen anesthesia the normal supply of oxygen is cut down from 20 per cent., which is approximately that contained in the atmospheric air, to from 10 to 6 per cent. thus shutting off the patient's normal supply by half and often more.

With analgesia it is safe to say that in the average case 20 per cent. of oxygen, usually more, is given to the patient. According to Klikowitsch nitrous oxid with 20 per cent. of oxygen is not only harmless but actually beneficial for certain conditions.

Gwathmey, in his excellent book on *Anesthesia*, refers to the work of this investigator as follows:

"Under the influence of nitrous oxid with 20 per cent. oxygen Klikowitsch found in the majority of healthy individuals accelerated cardiac contraction, diminished pulse waves, rarer and deeper inspirations. In cases of weakened heart action an unfavorable influence upon the heart not only failed to occur but a favorable effect was actually demonstrable. The cardiac contractions, while somewhat diminished in number, were increased in efficiency. For these reasons as well as on account of the beneficial influence on attacks of angina pectoris, on vomiting and cough of reflex origin, Kilkowitsch employed nitrous oxid for therapeutic purposes."

In analgesia the patient's color is pink and the blood does not give the surgeon a sudden start because of its dark color, as is sometimes the case with nitrous oxid anesthesia. The large amount of oxygen given in analgesia greatly increases the already wide margin of safety of nitrous oxid. In fact, it is hard to conceive of an overdose if the patient is kept in analgesia.

Morse has concluded from personal observations upon 200 cases of anesthesia, both nitrous oxid-oxygen and straight ether, that there is a direct relation between the frequency and severity of postanesthetic vomiting and the amount of cyanosis which occurred during the anesthesia. That the duration of the cyanosis was a more striking factor than the intensity, for transient cyanosis, though quite marked, frequently was not succeeded by this sequel, while on the contrary, low grades of ***slight*** duskiness, when prolonged for a measurable period of time, were invariably followed by postanesthetic evidence of acidosis.

With analgesia there is less oxygen starvation and hence we would naturally expect there would be less of the acid products which result from nonoxidation.

Crile has pointed out that a slight increase in acidosis is dangerous in cases with hemoglobinemia, shock, cachexia, toxemia, cardio-renal changes, pulmonary lesions and various other conditions of disturbed metabolism in which there is frequently excess of acid products in the blood. Crile and Menton have shown by their work on hydrogen-ion concentration that the deeper the anesthesia the more marked the acidity and the lighter the anesthesia the less the acidity and that the prolonged duration of the anesthesia is apparently not a factor in increasing the hydrogen-ion concentration of the blood. It might be concluded from their observations that analgesia, which is the lightest form of anesthesia, would be the least detrimental and that it could be prolonged without very harmful results.

We have had little postoperative vomiting and no evidence of marked increase in acidosis, though two of the cases showed traces of acetone and diacetic acid.

There have been no post-anesthetic headaches and none of patients have shown evidences of shock either during or after the operation. There has been a slight increase in blood pressure during operation and usually a reduction in pulse rate.

With nitrous oxid-oxygen analgesia I have not found it necessary to use an oral air-way to keep the air passage open. The breathing is almost normal, the tongue not falling back to cause labored breathing or obstruction as is sometimes the case in anesthesia.

Analgesia is of advantage in hernias and empyemas where it may be desirable for the patient to cough during the operation.

The patient regains consciousness in a few seconds after completion of the operation and as a rule is very shortly thereafter able to take nourishment.

In some cases we made functional kidney tests and found no marked decrease in kidney function. In two cases, one a leg amputation and the other an appendectomy, there was even slight postoperative increase.

There is no freezing of the nitrous oxid cylinder as often occurs with nitrous oxid anesthesia; this is because of the small amount of the gas used. Usually the cylinder is barely cold after a half hour's analgesia.

The cost of analgesia is less than of nitrous oxid anesthesia if oxygen can be procured as cheaply as we get it in Buffalo. We buy from a local manufacturing plant at so low a figure that cost of the oxygen is negligible.

If compelled to buy it at the regular market price the cost would be somewhat increased over that of nitrous oxid-oxygen anesthesia.

Disadvantages.

Nitrous oxid-oxygen analgesia has, I should say, about the same limitations as nitrous oxid-oxygen anesthesia. As Dr. Luke has aptly said: "Nitrous oxid, as compared with ether and chloroform is just a veneer form of anesthesia."

There is not the muscular relaxation that is possible with the hydrocarbon anesthetics. This is a handicap to the surgeon in deep pelvic or abdominal work, especially if he has been accustomed to working with complete relaxation. However, in some of our analgesia cases there has been good relaxation of the abdominal muscles, but relaxation cannot be relied upon

I should say that analgesia is contraindicated in open operations on fractures, where a slight move on the part of the patient might not only disturb but even destroy the work of the surgeon

Analgesia does not appeal to every patient, perhaps because it is not sufficiently well understood. A case of resection of the colon was recently brought into the hospital by the family physician with the desire on his part to have his patient operated upon under analgesia, but the idea of not being thoroughly asleep was not acceptable to her, even though she would suffer no pain and would have no recollection of the operation, so she asked me to keep her in complete anesthesia which I did.

If, during the induction period there develops a stage of excitement, which is very apt to be the case with alcoholics, I should say that analgesia was contraindicated.

Preliminary Medication and the Use of Local Anesthesia.

With two exceptions all of our adult cases have received a preliminary dose of ¼ grain of morphin hypodermically with the addition in three cases of 1/150 of hyoscin. Where no preliminary narcotic was given, although the patients were free from pain the analgesia was not as satisfactory because of slight reflex movements on the part of the patient. In some cases it is well to give two preliminary doses, one two hours and the second one hour before operation. If only one dose is given apparently the best time for its administration is one hour before operation.

In some cases we have used local anesthesia while in others we have omitted it entirely. It is not essential for the success of the analgesia, though it adds to the postoperative comfort of the patient. When not used more narcotics are required afterward.

Method of Administration.

In order to fully appreciate the effect of nitrous oxid it is essential that one should experiment upon himself. I became convinced of the analgesic effects of nitrous oxid when I administered it to myself for the preparation of a very sensitive marginal cavity in an incisor tooth. I not only had freedom from pain, but was sufficiently conscious at the close to turn off the cylinder of nitrous oxid which I held between my knees. Had I become anesthetized the cylinder of nitrous oxid would have slipped to the floor, thus preventing the possibility of an overdose.

For my work I have used an apparatus which has two gauges to register the comparative amounts of nitrous oxid and oxygen respectively. It has but one bag, situated between the mixing chamber and the mask. There is a valve permitting, when desirable, the short circuiting of the oxygen by which it is prevented from entering the mixing chamber but is conducted directly into the tube leading to the mask.

This is, I think, of considerable advantage in the administration of analgesia, for by it sudden large doses of oxygen may be given to the patient, should he be found to have entered the stage of anesthesia.

These temporary periods of anesthesia occur now and then, probably due to a sudden reduction in the pain stimulation incident to the operation.

I have always kept the ether chamber attached to the apparatus in case indication arose for deep anesthesia. No one should attempt nitrous oxid-oxygen analgesia unless he is familiar with nitrous oxid-oxygen anesthesia, for it may be advisable at any time to merge the one into the other. I have heated the gases and have employed a moderate amount of positive pressure except in those cases where it was contraindicated, such as the extremes of life. I have not used the nasal inhalers as has been employed in obstetrics and dentistry, for I believe that better control can be obtained with the face mask which covers both the mouth and nose.

It is a good plan to begin the administration of the gas and oxygen at least five minutes before the commencement of the operation in order to obtain uniform concentration.

I have usually first put the patient very lightly to sleep and immediately upon the commencement of the operation changed the percentage of the gases to bring the patient within the zone of analgesia. Sometimes it is necessary to increase the oxygen, at other times the nitrous oxid for the stimulation of the first skin incision may bring the patient from light anesthesia into light analgesia. Another reason for first inducing light anesthesia is to ascertain whether or not there develops a stage of excitement.

The greater the pain stimulation the greater percentage of nitrous oxid required to maintain quiet analgesia, hence, it is important for the anesthetist to keep informed as to the steps of the operation, so that he may anticipate the requirements.

REPORT OF CASES.

I have given nitrous oxid-oxygen analgesia throughout for the following operations:

Curettage.
Amputation of the cervix.
Plastic for cystocele.
Repair of perineum.
Curettement of necrotic bone.
Varicocele.
Hydrocele.
Circumcision.
Empyema.
Hernia.
Tonsillectomy.
Sub-mucus resection.
Excision tubercular nodes of the neck.
Leg amputation.
Radical breast amputation.
Exploratory laparotomy.
Appendectomy.

In others I have employed analgesia for parts only of the operation. There was one gastroenterostomy, during which the patient was in analgesia except during the delivery of the stomach and duodenum.

CASE REPORTS.

CASE I. Our first case, that for femoral hernia and removal of inguinal nodes, was operated upon by Dr. H. A. Smith. The patient was a large woman of 24 years. Preliminary dose of ¼ grain of morphin, ½ per cent. of novocain being used to inject skin only. Time of operation 40 minutes. Patient was quiet throughout, opened her eyes and coughed whenever requested to do so. Upon regaining consciousness said she had had pleasant dreams but did not know that she had been operated or had she any recollection of coughing. Recovery uninterrupted.

CASE II. Mrs. B. Well nourished woman of 47 years. Operation, cervix amputation, plastic for cystocele and perineum; appendectomy. Preliminary medication ¼ grain morphin. No local was used, except for abdominal wall. Complete exploration was made with surgeon's entire hand in the abdominal cavity. Lowest pulse rate during operation was 78. Highest, 108, when gall bladder was being palpated. Patient opened eyes throughout, upon request. No reflex disturbance except once during repair of perineum. Time, one hour and five minutes. Uninterrupted recovery.

CASE III. Mr. C. Fairly well nourished man of 54 years. Operation, amputation of leg for diabetic gangrene at junction of middle and upper thirds. Preliminary medication ¼ grain morphin. No local used except for skin. Patient responded to questions giving correct address, age, etc., but had no recollection of having done so afterward. Urinalysis showed 4.6 per cent. of sugar before operation. Five days after operation sugar had entirely disappeared. Primary union of wound occurred. Kidney function by the phenolsulphonephthalein test before operation 46 per cent., 24 hours after operation 47 per cent. There was acetone and diacetic acid postoperative for two days which was not present before. Time of operation 24 minutes. Patient discharged on the 19th day in good condition.

CASE IV. Mrs. W. Age 48. Weight 150 pounds. Operation, radical breast amputation. Preliminary medication ¼ grain morphin. Was very nervous and on the verge of tears when brought to the clinic. No local, whatever, used. Patient was quiet throughout. No kidney function test was made before operation, but nine hours after operation it was 42 per cent. Six days after, which might be assumed to be normal it was 51 per cent. Time of operation 55 minutes. Recovery uninterrupted.

CASE V. Mr. G. Well built man of 160 pounds. Age 23 years. Operation, double hydrocele. Preliminary ¼ grain morphin and 1/150 hyoscin, but was not sleepy. Local was used for one side, none for the other. No difference was observed. There was slight reflex as skin was being incised on both sides. Patient laughed, talked and sang during the operation. When asked if he were married said with vigor "not on your life." He had no recollection of having entered into conversation afterward and did not know that he had been operated. Time 34 minutes. Recovery uneventful.

CONCLUSIONS.

Although it is as yet too early to draw definite conclusions as to the place of nitrous oxid-oxygen analgesia in surgery, we have at least demonstrated that it is possible and feasible in both major and minor operations.

From the standpoint of the anesthetic it is the farthest removed from the danger zone.

Because of the large percentage of oxygen administered with the nitrous oxid it may prove to be the best form of anesthetic for those cases of disturbed metabolism in whom acidosis is present.

It apparently has no marked effect on kidney function, but further investigation must be made along this line.

As the postoperative starvation period is shortened there is therefore less liability to the development of acidosis from this cause which is especially liable in obese individuals.

As there is no irritation or obstruction to the air passages there is less liability to postoperative pneumonia.

In closing I wish to thank Dr. B. F. Hauenstein for his valuable assistance in carrying out the laboratory tests made in connection with these cases.

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APRIL EDITORIALS. 1916

ANESTHETIC MORTALITY.

The perennial question of *anesthetic mortality* is to the front again. It may be noted with interest that the majority of expert anesthetists are *sawing wood and saying nothing.* The most vitriolic arguers are surgeons who are employing nurse-anesthetists or who refuse to accommodate themselves to the progress made by their own professional anesthetists. To the up-to-the-minute operating teams throughout the country who play no favorites in anesthetic agents or methods, this tempest in a teapot about anesthetic mortality holds nothing of vital interest.

An undercurrent of professional jealousy evident in the juggling of statistics and reputations adds no scientific interest to the discussion. When the discussants, *pro and con*, post their anesthetic records with the same candor that Willis Drew Gatch did, when he reported 2,500 administrations of nitrous oxid-oxygen by rebreathing, from the surgical clinics of the Johns Hopkins Hospital, we may be warranted in drawing conclusions about the efficiency and safety of a certain anesthetic agent and method of administration. If the heresay evidence, in the discussion now rampant in certain journals, were ruled out, A. H. Miller's anesthetic statistics would remain, and to date they are the only one that will stand investigation.

The pity is that any argument about the comparative safety of anesthetic agents should arise at a time when every effort should be bent to the development of anesthetists who will make the administration of any agent by any routine technic absolutely safe for the special operative procedure in which both are indicated.

Why standardize surgery and then leave the mortality of anesthetics in the hands of nurses, internes and tyros. Until the American Medical Association, the American College of Surgery, and other influential organizations, recognize the expert anesthetist as worthy of being a confrere, the safety of patients under anesthesia and analgesia will go begging as of old.

The National Dental Association has conceded the Interstate Association of Anesthetists the honor and privilege of being its Anesthetic Section at the forthcoming meeting at Louisville in July. What medical or surgical organization has ever extended any anesthetic association a similar professional courtesy?

In connection with the futility of the statistics of anesthetic mortality the editor recalls with a feeling of satisfaction that Roland Skeel, who thinks accurately and talks bluntly, has recently naively confessed that by allowing foreign patients the same amount of underclothing to which they have always been accustomed during their entire stay in the hospital, including the period of the operative ordeal, that *ether pneumonia* has somehow or other disappeared from his surgical wards.—McM.

1916—MEETINGS—1916

The American Association of Anesthetists has made arrangements to meet in Detroit, June 12, in conjunction with the A.M.A. Headquarters and meeting place will be in the Hotel Tuller. Dr. James T. Gwathmey, the secretary, is arranging for a very interesting program on this occasion.

The Interstate Association of Anesthetists will meet in Louisville, Ky., July 25, 26 and 27, in conjunction with the National Dental Association. A feature of this meeting will be a Special Section of Dental Anesthetics to be held in MacCauley's Opera House in order to accommodate the attendance. Headquarters and meeting place will be the Red Room of the Hotel Seelbach. Exhibits will be held in the Armory. Dr. F. H. McMechan, the secretary, is in charge of preliminary details for the meeting.

Membership in a society devoted to your specialty is a sine qua non to success, and membership alone does not accomplish much unless you attend the meetings of the organizations to which you belong.

On account of the large attendance expected at each of these meetings it will be advisable for those who contemplate attending, to make their hotel reservations at the earliest possible moment. The programs and social entertainments in preparation will amply repay you for attending and bringing the ladies with you.—McM.

PENNSYLVANIA TO THE FRONT.

In speaking before the Section of Education of the Second Pan-American Congress, Washington, D. C., December 29, 1915, Dr. J. M. Baldy, of Philadelphia, outlined the efforts of the Bureau of Medical Education and Licensure of Pennsylvania in establishing the *intern-year* as an integral requirement of its Medical Practice Act.

Dr. Baldy's remarks were particularly interesting because they elucidated the *anesthetic situation* in his home state. It appears that the act of assembly, amending the medical act of 1913, requires that:

> Every candidate for admission to the Pennsylvania state medical examination shall have completed a year as intern in a hospital which shall have at least twenty-five beds to each intern, devoted to the treatment of medical, surgical, gynecological and special diseases; shall maintain or establish cooperation with a maternity department or hospital in which each intern shall have not less than six weeks' service or the equivalent thereof, during which time he shall have attended or participated in the attendance upon not less than six confinements; shall maintain a thoroughly equipped modern pathological and clinical laboratory proportionate to the necessities of the hospital; the records on file of the cases treated in said hospitals shall give evidence of the laboratory work so done by the intern; *shall maintain a department of anesthesia consisting of one or more anesthetists who shall have supervision over all the anesthesia given in the institution and whose duty it will be to instruct the intern in the administration of anesthetics.*

Many difficulties have arisen in the enforcement of this provision of the medical act, and although the requirements went into effect the first day of January, 1914, the work is as yet uncompleted. On investigation of the hospitals of the state, both those owned by the state and those owned by private corporations, many were found not to measure up to the standard written into the law. Laboratories, anesthetic departments and maternity departments were found wanting in a surprisingly large portion of the hospitals. On first investigation the Bureau of Medical Education and Licensure, which was made responsible for the administration of the act, was unable tentatively to approve more than a hundred out of about 200 institutions in the state. A year's trial of these institutions has developed many points of interest as well as of difficulty. It was found that there was a considerable reluctance by hospitals to raise and expend funds for the establishment of the laboratories and other required departments, in consequence of which a rider was attached to each hospital appropriation by the legislature of 1915 to the effect that *laboratories and anesthetic departments must be established in the institution to which the appropriation was made*, and the approval of these departments was placed in the hands of the Bureau of Medical Education and Licensure. With the original requirements in the amendment of 1913 and the requirements of the recent appropriation acts, the Bureau of Medical Education and Licensure has found the solution of the difficulties which presented themselves. It is now in process of inspecting all the hospitals, carefully going over with them the facilities they possess and indicating to them the necessary improvements and additions. The readjustment to the new order of things is being rapidly made, and it may confidently be predicted that within the next year every hospital in Pennsylvania which shall stand approved by the medical authorities for internship will possess a proper and sufficient equipment and personnel with which to give the intern a proper fifth year of medical study.

TO THE READERS OF THE SUPPLEMENT.

¶ A perusal of the announcements of apparatus, drugs and accessories in the Advertising Sections will amply repay those surgeons, dentists, specialists and anesthetists who, in their daily routine, are beset with the problems incident to handling operative risks under anesthesia and analgesia. —*Editor.*

Book Reviews

A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.

Painless Childbirth, Eutocia and Nitrous Oxid-Oxygen Analgesia. By Carl Henry Davis, M.D., Associate in Obstetrics and Gynecology, Rush Medical College; Assistant Attending Obstetrician and Gynecologist to the Presbyterian Hospital, Chicago. 134 pages; cloth. Forbes & Co., Chicago, 1916. Price, $1.00.

This interesting, although brief monograph, discusses the various methods employed in attempting to secure painless childbirth, and also details the author's experience and results with nitrous oxid-oxygen analgesia, which is rapidly becoming the analgesic of choice in obstetrics.

After tracing the historical evolution of the various methods of relieving the suffering of women in labor, Davis considers the chemistry, pharmacology, and toxicology of the several routine analgesic agents, and compares their advantages and disadvantages. He then makes a plea for eutocia, quoting liberally from many obstetrical authorities and the mortality records of several countries. His conclusion that maternity is more dangerous today than before the discovery of anesthetics and antiseptics is no less disconcerting than the fact that in the United States there is as much danger of the mother dying from puerperal sepsis as there is of the average woman dying of tuberculosis.

Davis believes that nitrous oxid-oxygen analgesia may be safely and efficiently used by every physician who is trained in the science and practice of obstetrics. It is not only the most satisfactory method of relieving the suffering of childbirth, but a valuable factor in securing eutocia.

The author describes the technic of administration in detail and gives many practical pointers for the application of nitrous oxid-oxygen analgesia to operative as well as normal labor, especially emphasizing its value in Cesarean section, in combination with local analgesia. Davis fortifies his conclusions not only with the records from the Presbyterian Hospital, but also with statistics from many other hospitals in which the method has been used, and these offer abundant evidence that nitrous oxid-oxygen analgesia is not only not harmful to the baby, but beneficial to the mother. The method and apparatus also provides a means of resuscitation for the blue baby.

Surgical Operations with Local Anesthesia. By Arthur E. Hertzler, M.D., Ph.D., F.A.C.S., Surgeon to the Halstead Hospital, Kansas, the Swedish Hospital and General Hospital, Kansas City, Mo. *Second Edition.* 312 pages; 173 illustrations; cloth. Surgery Publishing Co., New York City, 1916. Price, $3.00.

In his *second edition* Hertzler has wisely enlarged the scope of his original volume. Local anesthesia is inseparably connected with the surgical technic of every operative procedure for which it is available, and Hertzler has found it expedient to tell the operator just how to help himself out of those constantly occurring perplexities, when the operation and anesthesia fail to work out according to schedule.

The practical value of Hertzler's work is the fact that both the technics of local anesthesia and operation, which are advised, are the result of personal experience. While the author has scoured the world's literature on the subject, he advocates only those procedures which extended practice have proven the most satisfactory for the patient and operator.

While Herztler is a stickler for gentleness in operating under local anesthesia, he is equally as emphatic about acquiring a painstaking technic so that all procedures are absolutely painless. He goes further than most authorities by indicating the manner in which the patient may be rendered as free from pain and discomfort, postoperatively as is possible. The value of quinin-urea hydrochlorid, not only as an anesthetic, but also as a postoperative analgesic, owes much of its routine use to his teaching and influence. In his present volume he has extended its value and application to almost every operation necessitating local anesthesia.

The volume is substantially bound, printed on coated paper, and profusely illustrated. The regional anatomy and neurology are indicated whenever such demonstrations clarify the technic of anesthesia or operation, and there is no confusion of a half-dozen tentative technics when one satisfactory method has been established.

Practically every operative procedure that can be done under local anesthesia is described in detail and illustrated by plates and drawings which even the tyro will find illuminating.

While not assuming the dimension of some other textbooks on the subject, Hertzler's volume is one that the average surgeon will prefer to have for constant study and for intimate reference in the operating room. While not voluminous, it is comprehensive and complete, and the pages that might have been devoted to theoretical discussions are filled, instead, with the intricate details of administrative technic, so much more valuable to the operator.

Its convenient size and the practical value of its contents entitle it to a place in the surgeon's kit.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

FOURTH ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF ANESTHETISTS.

The Fourth Annual Meeting of the American Association of Anesthetists will be held June 12, 1916, on the Roof Garden of the Hotel Tuller, Detroit, Michigan, just previous to the sessions of the American Medical Association.

The following program has been arranged for the scientific sessions:

Why Anesthesia Fails, Wayne W. Babcock, Philadelphia, Pa.; Essence of Orange-Ether Sequence by the Closed Method, I. D. Kruskal, Brooklyn, N. Y.; An Experimental Research into Nitrous Oxid and Ether with Special Reference to (a) Certain Effects on the Organs of the Body, (b) Certain Relations to Normal Sleep, and (c) Certain Relations to Infection, George W. Crile, Cleveland, O.; Alcoholism and Drug Addiction in Relation to Anesthesia, F. H. McMechan, Avon Lake, O.; Ether-Oil Colonic Anesthesia, Walter Lathrop, Hazelton, Pa.; Signs of Shock and Complications, Before, During and After Operation, Joseph C. Bloodgood, Baltimore, Md.; Some Bodily Changes Under Anesthesia, F. C. Mann, Rochester, Minn.; Team-Work, Charles W. Moots, Toledo, O.; and Instruction of Medical Students and Hospital Internes in Anesthesia, Willis Drew Gatch, Indianapolis, Ind. (Chairman's Address).

The scientific sessions will be followed by a banquet at the Hotel Tuller in the evening.

For further information and banquet reservations kindly address

James T. Gwathmey, M.D., Sec.-Treas.,
40 East 41st St., New York City.

SECOND ANNUAL MEETING OF THE INTERSTATE ASSOCIATION OF ANESTHETISTS.

The Second Annual Meeting of the Interstate Association of Anesthetists will be held at the Hotel Seelbach (Red Room), Louisville, Ky., July 25, 26 and 27, in conjunction with the National Dental Association.

The following program has been arranged for the scientific sessions:

Address of Welcome and Presentation of Gavel, L. S. McMurty, Louisville, Ky.; Chairman's Address: Progress in the Technical Administration of Anesthesia and Analgesia, Wm. Hamilton Long, Louisville, Ky.; Anesthesia, the Anesthetist and the Operative Procedure from the Surgeon's Viewpoint, F. G. DuBose, Selma, Ala.; Metabolic and Organic Changes Under Anesthesia, Evarts Graham, Mason City, Ia.; Preparatory, Anesthetic and Postoperative Regime for Hazardous Risks in Genito-Urinary Surgery, Moses Salzer, Cincinnati, O.; A New Method for the Production of General Analgesia and Anesthesia, D. E. Jackson, St. Louis, Mo.; Nitrous Oxid-Oxygen in Obstetrics, Carl H. Davis, Chicago, Ill.; Ether-Oil Colonic Anesthesia in Head and Neck Operations, Joseph E. Lumbard, New York City; Some Direct and Indirect Dangers of Nitrous Oxid-Oxygen and Its Ultimate Position in Major Surgery, Jno. N. Heim, Louisville, Ky.; Oral Hygiene in Relation to Anesthesia and Analgesia, Bion R. East, Detroit, Mich.; Control of Circulatory Disturbances Under Anesthesia and Analgesia, Emmett F. Horine, Louisville, Ky.; Historical Section: Hewett of Chicago, and Chloroform Analgesia, Wm. Harper DeFord, Des Moines, Ia.; Crawford W. Long and Ether, E. M. Magruder, Charlottesville, Va.: The Romance of Evans and Nitrous Oxid, Edward C. Kirk, Philadelphia, Pa.: Hickman, a Forgotten Pioneer, C. J. S. Thompson, London, England.

An innovation will be a Special Section of Dental Anesthetics, for which the Association will adjourn to MacCauley's Opera House. The special program for this joint session with the National Dental Association will be as follows:

Introductory, Wm. Hamilton Long; Chairman's Address: Anesthesia and Analgesia in the Curriculum, the Clinic and Private Practice, Hugh W. MacMillan, Cincinnati, O.; Oral Operations Under Nitrous Oxid-Oxygen Anesthesia in the Forward-Inclined, Sitting Posture, Ira O. Denman, Toledo, O.; Vapor Anesthesia for Oral Surgery, Truman Brophy, Chicago, O.; Intra-Oral Methods of Local Anesthesia, Rich. H. Riethmuller, Philadelphia, Pa.; Extra-Oral Methods of Local Anesthesia, Kurt H. Thoma, Boston, Mass.; Handling Emergencies Under Anesthesia and Analgesia, N. T. Yager, Louisville, Ky.

The Association Dinner will be served at the Hotel Seelbach and a number of prominent after-dinner speakers will enliven the occasion with their wit and humor. Special entertainment will be provided for all lady guests attending the Louisville meeting.

For further information and dinner reservations address

F. H. McMechan, M.D., Sec.-Treas.,
Avon Lake, Ohio.

A MEANS FOR MECHANICAL ANESTHESIA.*

FREDERICK MONTGOMERY, M.D.,
Chief Anesthetist to the Woman's Hospital,
New York City.

The results which I have obtained in the administration of between 400 and 500 anesthesias by mechanical anesthesia justify me in stating that it offers a more satisfactory method of open-drop etherization than the hand method so routinely employed.

The device employed for mechanical anesthesia is very simple. In construction and mechanical principle it is similar to the vichy syphon. It consists of an air-tight graduated glass container having a cap arranged with two valves. One valve is an inlet valve for air, similar to the valve in an automobile or bicycle tire which permits air to enter, but has a shut-off to prevent its escape. The other valve is an outlet valve to control the flow of anesthetic forced out under the air pressure. This valve is so adjusted that the number of drops per minute discharged from the container may be very accurately controlled. The air pressure necessary to operate the device is obtained by means of a small rubber hand bulb similar to an atomizer bulb. This bulb is only used to charge the apparatus, after which it is removed just as in the case of a bicycle tire pump, after the tire is inflated. When the device is filled with the anesthetic and charged with air in this way it is ready for use and will operate automatically until it is emptied. The anesthetic is discharged through a long flexible tube to the face mask, where it is diffused upon the gauze by means of multi-perforated tubes arranged in the mask. All the anesthetist has to do is to place the mask upon the patient's face and turn the valve so that the requisite number of drops per minute are flowing to the mask. The rate of flow is observed through the glass sight feed on the cap.

One can readily see the advantage of initiating an anesthetic with this apparatus. The careful initiation of an ether anesthesia is very important, but the accurate, careful administration of chloroform is vital. Chloroform carelessly, too freely, or rapidly administered at the beginning is the cause of many deaths. It has been said that 50 per cent. of the chloroform deaths occur during the induction of anesthesia. A gradually increasing or diminishing amount of anesthetic, which can be given by this device, means a gradually increasing or diminishing percentage of ether or chloroform vapor. There are no abrupt changes. The patient is not subjected to the many disadvantages of first having to breathe free air and then suddenly forced to breathe a concentrated ether or chloroform vapor. In my opinion it is these rapid changes in percentage of anesthetic vapor respired that cause many of the difficulties, such as excitement during early stages of anesthesia, retching and vomiting and mucous secretion.

A very definite percentage of anesthetic vapor may be obtained by this method, and the majority of patients after they are anesthetized require about the same percentage of anesthetic to keep them anesthetized. This fact, which is borne out in many ways and is well understood by those who have given anesthesia to any extent, makes the mechanical administration of anesthetics the ideal method. The patient, as shown, is carefully gotten under the influence of the anesthetic, and after being anesthetized is kept in this condition by a constant dropping of the anesthetic, which is slightly diminished toward the end of the operation and is slightly increased from time to time if any undue operative irritation is anticipated.

One of the difficulties of the hand method of administration is that we never quite know what percentage of anesthetic the patient is getting and if we are keeping the patient under lightly we may without realizing it allow him to come out, and then, wishing to correct our error, we are apt to give more anesthetic too suddenly or in too great an amount, which may tend to make the patient retch. *By the mechanical method we know that if after the first twenty minutes the patient is properly anesthetized by the administration of so many drops per minute, the maintenance of this amount of anesthetic will insure the patient remaining properly anesthetized and we can actually maintain the same amount. There is no guess work. We never need to feel, therefore, that the patient is going to come out, no matter how lightly we may have him anesthetized. This gives a great feeling of security to the anesthetizer, who ordinarily is kept on pins and needles unless he has his patient so deeply under that he knows there is no danger of any sudden change.* Again, toward the end of an operation, especially a long operation, the anesthetic may be reduced by this mechanical method of administration so slowly and evenly that at the end of the operation, though ether has been used, the patient will be almost conscious.

To speak of the advantages of this form of administration of anesthetics from the standpoint of the patient is only to describe the advantages of the open-drop method properly given. Heretofore the administration of anesthetics by the open-drop method has necessitated manual skill and muscular effort in addition to the knowledge of anesthesia. By means of this method the hands are free. This is a very great advantage. The jaw may be held up with both hands, as is often necessary. The table may be adjusted quickly without altering the anesthesia; in fact, after an anesthetic has been initiated in this way very little attention is really necessary. The use of the long flexible tube makes it possible to administer anesthetics in neck or breast cases without interference with the operator or his assistants by reason of the presence of the anesthetist. A towel can be thrown over the mask and the patient need only be observed at intervals.

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*Read before the Society of the Alumni of Bellevue Hospital, March 3, 1915, and before the New York Obstetrical Society, May 11, 1915.

VAPOR ANESTHESIA FOR INTRAORAL SURGERY.*

F. H. McMECHAN, M.D.,
Cincinnati, O.

There are few surgical procedures in which team-work between surgeon and anesthetist is fraught with more beneficial results than in operations within the mouth. The difficulties which the anesthetist must surmount are: (1) To maintain an even plane of light surgical narcosis, with unimpeded respiration; and (2) to provide a practically bloodless field of operation for the surgeon.

These two essentials can only be secured by the expert manipulation of certain mechanical anesthetic devices and by an intimate knowledge of the classical technic for the operation in hand or the methods of the individual operator.

To simplify the anesthetic technic for intraoral operations the author now uses a modified Gwathmey vapor apparatus attached to the latest Oxygen Autogenor, supplemented by a Williams' water-vacuum aspirator, a Doyen gag or Pynchon nasal tubes.

The vapor method of anesthesia does not lend itself readily to the induction of narcosis, so the patient is preferably anesthetized by the essence of orange-ethyl chlorid-ether drop method. A few drops of the essence of bitter orange peel are dropped on the gauze of a double chamber mask, and the patient breathes until this potent odor has obtunded his olfactory sense; then ethyl chlorid, from 2 to 6 cc., is administered by means of a graduated glass dropper attached to a Gebauer 100 cc. metal container. As soon as breathing becomes rhythmical or slight snoring supervenes, ether is dropped synchronously with the ethyl chlorid until the desired plane of surgical narcosis has been reached. This depth of narcosis must be sufficient to allow for the transition from the drop to the vapor method of anesthesia without the patient coming out. The Doyen mouth-gag is now inserted and the vapor administered through its auxiliary attachments or else through the Pynchon nasal tubes.

The success of the vapor method of anesthesia depends on the establishment and maintenance of oral breathing when the anesthetic is administered through the gag, or in providing a sufficient flow and pressure of anesthetic ladened air or oxygen through the nasal tubes to offset the diluent effect of oral respiration. The plane of narcosis may be regulated by increasing or decreasing the anesthetic tension of the vapor delivered or by momentarily occluding the nostrils or covering the mouth to deepen oral or nasal breathing, respectively. It is advisable to use a free flow of ether-oxygen in making the transition to the vapor method, as the error of the inexperienced is most frequently on the side of too light rather than too deep a surgical narcosis. In very recalcitrant subjects it is advisable to use the C. E. mixture vapor to secure a flaccid condition of the patient.

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*Read before the West End Medical Society, Cincinnati, O.

The required depth of surgical narcosis for intraoral operations will vary with the temperament of the individual operator and the skill of the anesthetist. It may be light enough to preserve the cough reflex, and should seldom if ever be deeper than a sluggish pupillary response or conjunctival reflex.

Having secured a satisfactory plane of surgical narcosis, the vapor apparatus will require little or no attention except a momentary adjustment of the needle-valve to increase or decrease the flow of oxygen, or a turning of the regulating valve from full ether to ascending or descending proportions of the C. E. mixture. The anesthetist is thus enabled to watch his patient carefully and to maintain an unobstructed air-way and unimpeded respiration.

The judicious use of the Williams' aspirator across the base of the tongue will enable the anesthetist to keep a practically bloodless field for the operator; and he will elicit none of those reflexes which are so prominently provoked by swabbing out the throat with gauze sponges. Also the collecting of the blood lost during the operation in the aspirator bottle gives absolute assurance of the extent of any hemorrhage that has taken place.

Concerning the routine use of oxygen there is this to be observed. While the average child or adult may be safely carried through an operation with anesthetic ladened air, still the lymphatic child, the alcoholic adult and the cachetic wreck will be far more safely handled by the concomitant use of oxygen.

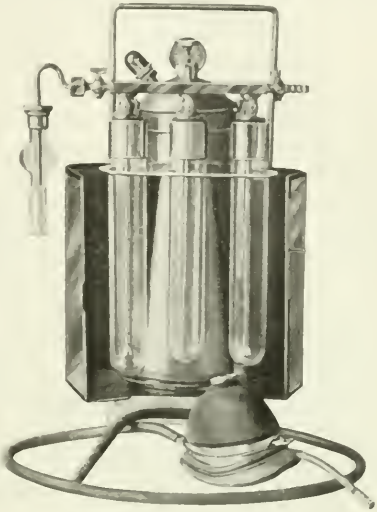
This current practice of using oxygen as an adjunct to anesthesia has not only the scientific basis of laboratory research to recommend it, but also the corroborative endorsement of exhaustive clinical results. The dictum of Gwathmey, that "*oxygen increases the safety of all anesthetics as regards life, without decreasing their anesthetic effects*," has never been successfully controverted. Also too much emphasis cannot be placed on Hewitt's conclusion with regard to shock that *the oxygen limitation factor is of greater importance in the conservation of vitality than the carbon dioxid retention.*

These dicta coincide with the clinical results of Buxton in the concomitant use of oxygen during narcosis. *The narcosis so obtained is more profound than can be ensured when using ether by itself, as the hyperoxidation of the tissues enables more ether to enter the circulation than could otherwise occur, without danger to the nervous centers, hampered as they would be by deoxidized blood.*

The importance of the oxygen intake to the conservation of vitality and its exceptional vitality to surmount respiratory difficulties is based on Neudorfer's theory of the elective affinity of the pulmonary circulation to certain gases. Neudorfer found that *while allowing for a variation in the affinity of hemoglobin for oxygen, which is not a constant factor and which is markedly reduced in anemias, nevertheless an excess of the gas weakest in affinity rendered the other gases present innocuous.*

This logically explains how during impeded respiration, after the oxygen content of the alveolar air is exhausted, the remaining ether vapor is in excess and is abruptly and overwhelmingly taken up by the elective affinity of the pulmonary circulation. In the presence of hyperoxygenation, the oxygen content of the alveoli and bronchi is sufficiently excessive to counteract almost any amount of respiratory embarrassment.

While Gwathmey has perfected the most satisfactory regulating device for vapor anesthesia, it has remained for the autogenor to supply a portable, flexible, self-adjusting pressure supply of nascent oxygen. By the contact of fused sodium peroxid with water it yields pure, nascent oxygen under any required pressure from 0 to 50 pounds per square inch, a force sufficient to drive any vapor device, with the added advantage that the pressure created automatically adjusts itself to overcome the resistance offered to the issuing gas. This working pressure drops to 0 after use or it may be regulated to blow-off at any pressure up to 50 pounds by means of the safety valve. Thus the autogenor meets the varied resistance offered by the outflow of ether-oxygen alone through the wash-bottle or the differential resistances of ether or chloroform or the C. E. mixture in combination.



Also during resuscitation the resistance offered by paralysis of respiration, fixation of the chest, collapse of the trachea, or edema of the glottis, increases the pressure in the autogenor to such a degree as is required by the oxygen to force its way past the obstruction to the lungs and expand the cavity. As soon as perflation results in the restoration of normal breathing, the gas pressure falls automatically to slightly above atmospheric tension.

Postoperatively the inhalation of oxygen should be continued until the patient is in rational possession of all his faculties. Such a precautionary measure obviates the occurrence of the usual post-anesthetic complications.

In summary the advantages of this detailed technic of anesthesia for intraoral operations are:

1 The simplicity and efficiency of the apparatus and supplementary devices.

2. The safety and freedom with which the anesthetist may assist the operator both in the control of the patient's position and in the maintenance of a practically bloodless operative field.

3 The assurance of having resuscitative apparatus at hand for any emergency that may arise, and

4. The use of a method that not only combats shock but obviates the occurrence of the usual postanesthetic complications.

DENTAL ANESTHETICS.[*]

J. G Henahan, D.D.S.,

Cleveland, Ohio.

The advancement of Dentistry as a scientific profession depends like Medicine upon the efforts of its individual members.

We have reason to be justly proud of the advancement which we have seen during the last few years as well as of the men who have made this advancement possible and who at the same time have made their names famous in the history of Dentistry.

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[*] Read before the Ohio State Dental Society, Columbus, Ohio, December, 1915

Observers within our ranks have been of the greatest of service to medical research in various branches, and each year sees dentistry occupying a more important position in the opinion of the medical profession with which there is a constantly growing tendency to work in unison.

It has often been regretted that the two professions did not from the start unite their efforts and develop in common, and while undoubtedly some advantages would have accrued from such an arrangement, I firmly believe that humanity has profited to a much greater extent due to the fact conditions existed as they were and that dental science has been perfected much more rapidly for the same reason. I believe, however, that the future will see the practicing dentist a medical as well as dental graduate.

Among the important branches of science which dentistry has helped in developing, that of anesthesia stands foremost. Dentistry was quick to grasp the advantages of cocain and its substitutes for the production of local anesthesia, and divides with medicine the honor for the development of the science and practice of *analgesia*.

It seems strange that with these well-founded claims to encourage us that dentists have not more universally employed anesthetics in their work.

That we have not done so is evidenced by the fact that probably 95 per cent. of all dental operations are still performed without the assistance of any anesthetic.

As dentists we are in position through our daily work to note the cause and effect of shock due to fear or pain, and consideration of the situation will reveal the fact that not always is it the patient who is the sufferer, but oftentimes the dentist, due to the mental and nervous strain to which he is subjected in some of his trying cases.

So widespread among the public is the fear of the dentist, that it would seem that it has almost become a natural condition. This would appear to be the result of the accumulated effect of the pain and fear caused by succeeding generations of dentists since dentistry was first practiced in its crudest forms.

Have we the right to continue in this way, or shall we follow the path which science has opened for us and as a united profession adopt all means which make humanitarian dentistry possible? The time has about arrived when this is not to be considered a matter of privilege with us, but as a matter of compulsion.

Patients know that painless and shockless operations are possible and are demanding that such services be rendered.

The general use of anesthetics would help to prevent shock and at least to an extent correct certain dangerous customs which were practiced in the past. We all know of the number of practically good teeth which were devitalized to allow for a restoration without pain, and we must recognize the fact that at least some of those teeth were lost for want of proper root canal treatment and filling, not only this, but while this imperfectly filled tooth existed in the jaw it was a constant menace to the general health. The apical abscess may have been a focal point for some local or general infection, such as rheumatism, arthritis, lesions of the heart, diseases of the skin, or infections of the eye or ear. In recognition of this possibility every able medical diagnostician of today bears the teeth in mind when searching for some obscure cause of disease.

Painless Dentistry, the term which only a short time ago was wholly the term of the fakir, is today synonymous with perfect dentistry. Dentistry today needs to be not only free from pain and shock, but all other disagreeable effects, if the dentist is one whose ambition and energy have stimulated him to perfect himself in the knowledge that is to be had.

All surgeons recognize the fact that no single anesthetic or anesthetic method would suffice for all cases. Good practice would indicate the selection of the agent or method best indicated for any given case. In some cases, in order that shock as well as pain be eliminated, it is necessary that both local and general anesthesia be employed. Nitrous oxid and oxygen analgesia and anesthesia will always have an important place in dental practice, in the first place because there will frequently be present cases where nothing short of general anesthesia will permit of the accomplishment of satisfactory results, and secondly, because where a combination of anesthetics is necessary this agent is far more desirable than any other general anesthetic agent for this purpose.

The successful practice of conductive anesthesia depends upon several conditions, each of which must be considered with the strictest adherence.

They are as follows:

(1) A knowledge of the anatomy of the region under consideration, including a thorough knowledge of the nerve supply, the condition of the bones in various locations, as well as the several bony landmarks which serve for guides.

(2) The most complete asepsis governing the anesthetic solution, the instruments, the field of operation and the operator, and

(3) The preparation of the solution and the carrying out of injections according to prescribed technic.

The principal contraindication to infiltration anesthesia is an already existing infection in the field of operation. An injection should under no circumstances be made into pathologic tissue for fear of spreading the infection. By conductive anesthesia, however, the injection can be made at a point remote from the infection, and reaching the main nerve, may be considered under these circumstances not only as an anesthetic, but as a curative procedure. It is a recognized fact that inflammatory conditions are not only controlled but subdued by the existence of local anesthetic condition in the affected area.

The man who perfects himself in these technics with the intention of only using them in extracting is wasting his time. I believe that extracting operations should, wherever possible, be performed under a general anesthetic, for there is no other operation which we are called upon to perform which is so often attended by psychic as well as surgical shock.

It is in the operative field where the dentist will realize his chief advantage. There is no dental operation which is likely to cause pain but which may be performed to better advantage with the aid of infiltration or conductive anesthesia. Cavity preparations for inlays and fillings, preparation of teeth for jacket or other forms of crowns, removal of pulps, opening of abscessed teeth, removal of pulp stones or calcified pulps, treatment of pyorrhea in such cases as an anesthetic is required, removal and treatment of pericemental abscesses, resections of a root apex for fitting bands, for setting or cementing crowns and bridges. It may also be employed with the most happy results as a diagnostic measure in the search for the cause of neuralgia and antrum trouble.

630 ROSE BUILDING.

Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

ANALGESIA PRODUCED BY OPIUM ALKALOIDS, QUANTITATIVE STUDY OF INDIVIDUALLY AND IN COMBINATION, IN NORMAL MAN. D. I. Macht, N. B. Herman and C. S. Levy, Baltimore. Journal of Pharmacology and Experimental Therapeutics, January, 1916.

ANESTHESIA, GENERAL, IN WAR HOSPITALS. V. A. Oppel, Russkiy Vrach, October 30, 1915.

APPARATUS—MANUFACTURE AND ADMINISTRATION OF NITROUS OXID FOR ANESTHESIA: EXPERIENCE OF LAKESIDE HOSPITAL. A. R. Warner, Cleveland. Journal American Medical Association, December 4, 1915.

APPARATUS, NEW, AND INTRATRACHEAL TUBE FOR INTRATRACHEAL ETHER ANESTHESIA. S. Robinson, Rochester, Minn. Surgery, Gynecology and Obstetrics, December, 1915.

APPARATUS—WARM ANESTHETIC VAPORS, ADVANTAGES OF AND AN APPARATUS FOR THEIR ADMINISTRATION. F. E. Shipway. Lancet, January 8, 1916.

CAUDAL ANESTHESIA IN GENITO-URINARY SURGERY. Bransford Lewis and Leo Bartels, St. Louis. Lancet-Clinic, January 8, 1916.

CHLOROFORM, DIAGNOSTIC IMPORTANCE OF THE MODIFICATION IN TENDON REFLEXES UNDER. J. Babinski and A. Fremont. Bulletin de l'Academie de Medicine, October 19, 1915.

CONDUCTIVE ANESTHESIA. George T. Gregg, Pittsburgh. The Dental Summary, December, 1915.

Diet, the Influence of on Hepatic Necrosis and Toxicity of Chloroform. EUGENE L. OPIE and LELAND B. ALFORD, St. Louis, Mo. *Journal of Experimental Medicine.* Vol XXI, No. 1, 1915.

The destructive action of chloroform on the cells of the liver has long been recognized. Chloroform administered in sufficient quantity to animals by inhalation or by stomach causes necrosis implicating the center of each lobule of the liver, perhaps extending four-fifths of the distance from the central vein to the surrounding portal spaces. The poison exhibits a peculiar affinity for the hepatic cells, for, whereas parenchymatous cells of other organs such as the kidney and heart undergo injury exhibited by fatty degeneration, widespread necrosis is limited to the liver.

The occurrence of the same change in man is demonstrated by delayed chloroform poisoning, which occasionally follows the administration of chloroform for anesthesia. In association with excitement, delirium, coma and other symptoms referable to the nervous system, jaundice appears and increases in severity. Crystals of leucin and tyrosin in the urine may suggest advanced protein disintegration referable in the presence of jaundice to disintegration of hepatic tissue. After death the liver is enlarged and exhibits advanced necrosis beginning in the centers of the lobules.

Numerous observers following Strassmann and Salkowski have shown that administration of chloroform by inhalation or by mouth is followed by increased elimination of urinary nitrogen, sulphur and phosphoric acid. Howland and Richards, reproducing delayed chloroform poisoning in dogs, have shown that necrosis of the liver is associated with the increased elimination of sulphur and nitrogen which accompanies intense disintegration of body protein.

Chloroform was selected as an example of a poison capable of causing death and disintegration of hepatic cells, and experiments were undertaken to determine if protein disintegration might be modified by diet. These experiments were made on white rats since preliminary experiments determined that the fatal dose of chloroform for these animals could be determined with fair accuracy. Chloroform was diluted with two parts of paraffin oil selected as an indifferent substance absorbed with difficulty. In a preliminary experiment, a dose approximately 0.2 c.c. per hundred gm. of body-weight failed to kill; from 0.3 to 0.5 per hundred gm. killed in four days; 0.6 in two, and 0.7 in one day. Irregularities in the action of the poison were occasionally seen.

In the series recorded in Table 1, animals were given during four days (*a*) oats and cane-sugar, (*b*) meat alone or (*c*) fat (of beef) alone. On the three diets the average body-weight of each group of animals was maintained. Table 1 gives the length of life in days of the animals which died.

Animals which received carbohydrates survived, whereas all of those which received meat and fat died. Difference in toxicity is further shown by the average duration of life of animals which survived after the various diets. Microscopic examination of the livers of the animals which died showed that necrosis was scant in animals which had received a carbohydrate diet, implicating one-third or one-fourth of the radius of the liver lobule, whereas in animals which received meat or fat, necrosis affected from two- to three-fifths of the lobules, destroying at least half in all save two instances. Necrosis is found in all animals which died within four days after intoxication.

TABLE 1.—LENGTH OF LIFE IN DAYS OF ANIMALS WHICH DIED.

Chloroform per 100 gm c.c.	Oats and Sugar	Meat	Fat
0.1	*	3	2
0.15	*	4	1
0.2	*	*	2
0.25	*	2	2
0.3	4	[illegible]	2
Average duration of life	4⅔ +	3	1⅘

*Lived.

The foregoing experiments suggested that smaller doses of chloroform might demonstrate greater differences referable to diet. In view of the rapid fatality after administration of fat the minimum dose with this diet was placed at 0.02 c.c.; from previous experiments it was assumed that animals receiving carbohydrates or meat would survive this dose. After six days on the various diets animals which had received carbohydrates lost an average of 4 gm. each, those on meat maintained their weight and those on fat lost an average of 15 gm. each (Table 2).

Three times the fatal dose for animals receiving fat (0.05 c.c.) is survived by animals which have received a meat diet, whereas five times this dose is survived by animals which have been fed on starch and sugar. The experiments are in accord with the observations of those (as Shaffer and Coleman for typhoid fever) who have shown that carbohydrates prevent the disintegration of body proteins. The average duration of life of those which survived furnishes further evidence of the protective action of carbohydrates and the injurious effect of fat. Advanced necrosis of the liver was found in those animals which died after receiving meat and fat, and serves as an index of the severity of intoxication.

TABLE 2.—LENGTH OF LIFE IN DAYS OF ANIMALS WHICH DIED.

Chloroform per 100 gm c.c.	Oats and Sugar	Meat	Fat
0.025	..	..	*
0.05	*	11	3
0.1	10	*	1
0.15	*	*	1
0.2	*	3	2
0.25	*	3	2
Average duration of life	10—	5⅔ +	1⅘

*Lived.

Since animals of the foregoing series which received fat alone exhibited a loss of body-weight, the experiment was repeated by adding fat to a carbohydrate diet.

TABLE 3.—LENGTH OF LIFE IN DAYS OF ANIMALS WHICH DIED.

Chloroform per 100 gm c.c.	Oats and Sugar	Meat	Oats and Beef-Fat	Oats and Cottonseed Oil
0.05	*	2	2	*
0.1	*	5	*	2
0.15	*	3	2	2
0.2	*	3	2	2
0.25	*	*	2	4
Average duration of life	..	4¼—	2—	2½—

*Lived.

To one group of animals beef-fat inseparably mingled with rolled oats was given; to another group which received as much oats as they would eat, cottonseed-oil (1 c.c. daily) was administered by mouth. The average body-weight in each one of these groups was slightly increased after five days. At the end of this time chloroform was administered (Table 3).

The protective action of carbohydrates is conspicuously shown. The difference between the effect of meat alone and of fats combined with carbohydrates is not so great as the difference in the influence of meat and fat alone, the protection afforded by carbohydrates combined with fat being evident. Nevertheless, the average duration of life among animals which survived exhibits the dangerous influence of fat. The experiments furnish evidence that fat administered to animals and presumably stored in part in the liver increases the susceptibility of the organ to the injurious action of chloroform.

Ether Anesthesia, Dangers of. W. W. Keen, Philadelphia. Boston Medical and Surgical Journal, December 2, 1915.

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Local Anesthesia in Exenteration and Enucleation of the Eyeball with Novocain Solution. H. Illig, Munich. Archives of Ophthalmology, January, 1916.

Local Anesthesia, Total Removal of the Orbit Under. Herbert P. Cole, Mobile, Ala. Journal American Medical Association, December 4, 1915.

Local Anesthesia, Tonsillectomy by Blunt Dissection Under. J. B. Horgan. Journal of Laryngology, Rhinology and Otology (London), December, 1915.

Local Anesthesia, Decompression Under. Herbert P. Cole, Mobile, Ala. *Annals of Surgery,* December, 1915.

Having occasion recently to perform decompression on an epileptic with a dubious prognosis from the standpoint of cure, local anesthesia was adopted as the procedure subjecting the patient to the least risk.

The patient, referred by Dr. Seale Harris, of Birmingham, Alabama, a white male, aged 33, gave a history of injury to the skull years before admission to our clinic. The location of injury was indefinite, though the onset of the typical epileptic convulsions definitely followed the injury. There being no evidence of a focal nature, decompression was advised only because years of medical treatment had not availed. Believing that a decompression performed on the patient in a conscious state might disclose the focal point more readily, we determined upon the use of local anesthesia.

Preliminary scopolamin-morphin was given. After the usual preparation a tourniquet was placed about the head with comfortable pressure. After the method of Braun about 60 cc. of a 1 per cent. novocain-adrenalin solution was injected at seven points over the temporal region above the tourniquet. The solution was injected in all the layers of the scalp down to the periosteum and the points of injection were connected both superficially and in the deep tissues, thus providing a seven-sided area of anesthesia.

An osteoplastic decompression was then performed with no discomfort to the patient. We noted with considerable surprise the absolute absence of pain in the periosteum and upon trephining the bone and using the Gigli saw and rongeur. A rather large dural flap was made without sensation to the patient, the pia beyond appearing rather edematous, was apparently normal. Pressure stimuli on the anterior Rolandic area elicited little response and we believe the infiltration tended to reduce pressure stimuli—a possible objection to local anesthesia in some cases. Efforts at pressure stimuli were shortly followed by a rise in pulse rate to 150, the arteries became engorged, and the patient passed through a typical epileptic seizure of several moments' duration. No focal signs presented. The patient was controlled during the convulsion and at its end the operation was completed by passing the dural flap out between the bone into the temporal muscle. The osteoplastic flap was replaced and sutured. The patient returned to the ward with a pulse of 120, in excellent spirits and complained of no pain.

The patient made an uninterrupted recovery, suffering very little after-pain and having no urinary changes. The pressure of the tourniquet was the only uncomfortable sensation during the entire operation. He was conscious of having had the epileptic seizure. The patient has had a diminution in the number and severity of his attacks.

In conclusion, cerebral cases presenting grave and uncertain prognoses do not warrant serious operative risks. Local anesthesia permits of extensive intracranial procedures. It will also, doubtless, do much to clear up the localization of motor and sensory areas by permitting extensive observations on the conscious patient.

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Nitrous Oxid Analgesia in Obstetrics. E. I. McKesson, Toledo, O. The Modern Hospital, January, 1916.

Nitrous Oxid Administration in Obstetrics. Technic of. A. K. Paine, Boston, Mass. Surgery, Gynecology and Obstetrics, February, 1916.

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Spinal Anesthesia with Stovain in Genito-Urinary Surgery. J. S. Read. New York Medical Journal, January 15, 1916.

Twilight Sleep, Present Status of in Obstetrics: Study of over 2,000 Cases. A. J. Rongy. American Journal of Obstetrics, November, 1915.

TO THE READERS OF THE SUPPLEMENT.

¶ A perusal of the announcements of apparatus, drugs and accessories in the Advertising Sections will amply repay those surgeons, dentists, specialists and anesthetists who, in their daily routine, are beset with the problems incident to handling operative risks under anesthesia and analgesia. —*Editor.*

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SOME ESSENTIAL POINTS IN THE ANATOMY AND SURGERY OF THE THYROID GLANDS.*

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In a paper before the American Laryngological Society in 1914 I gave reasons why the otolaryngologist should perform the surgery of the head and neck. Dr. Joseph Beck and others had made similar arguments. The anatomic relations of the larynx and pharynx to the structures of the neck, including the thyroid, have always been obvious; and lately the pathologic relations of these regions have come into prominence. Shurley, Beebe, and others have ably discussed this relationship from the standpoint of the laryngologist. The surgical progress leading the operator from the performance of simple intralaryngeal operations to the more open surgery of the head and neck has been both natural and necessary. The pathologic processes occurring in the original fields of the specialty led frequently to external disturbances which more and more required surgical interference from without. For example a discharging ear sometimes led to brain abscess or sinus thrombosis, requiring brain surgery on the one hand or jugular ligation and excision on the other. The cervical lymph nodes of the neck are frequently infected secondary to tonsil or other throat disease and requires external surgery. Laryngeal stenosis, laryngeal infection or malignant growths of the larynx frequently call for immediate external surgery, high or low tracheotomy, pharyngotomy or laryngectomy. The performance of all these operations by the laryngologist has familiarized him with the surgical anatomy of the head and neck, and with the surgery of these regions. His present knowledge of the diseases of both the interior and the exterior of the head and neck should, therefore, entitle the laryngologist to perform the surgery of both regions, and, provided his anatomical knowledge and surgical training are thorough, he should, because of this intimate understanding of both exterior and interior regions, be best able to perform such work.

An accurate understanding of the surgical anatomy of the thyroid gland and its environment is a first essential to success in thyroidectomy. This cannot be obtained solely from text-books and therefore repeated dissection of the neck with special reference to the relations of the thyroid is an essential preliminary training. I shall not discuss the details of this anatomy further than is necessary to emphasize the points that are of paramount importance to safety in thyroid operations. These important points are:

1. The large blood supply which enters the gland chiefly at the upper and lower poles.

2. The capsule of the thyroid, or better capsules, for there are two, an outer or surgical capsule and an inner or glandular capsule. The latter is the one usually in mind when the term thyroid capsule is used. The importance of knowing these capsules well lies in the fact that the thyroid may be rapidly and completely separated from its enveloping tissues in the neck provided the work of separation be carried out entirely between the two capsules. Attempts at separation either outside the surgical capsule or inside the glandular capsule are slow, uncertain, and may be attended or followed by serious consequences, as I shall presently point out. The distance between the surgical and glandular capsules is normally slight, and may be obliterated in case of great hypertrophy of the thyroid, inflammation in or adjacent to the gland, or in malignant disease. The intracapsular space is normally filled with loose areolar tissue and surrounds the entire thyroid gland. The isthmus of the thyroid is in closer contact with the trachea and hence one gets the impression during the process of removal of the isthmus that the capsules are rather closely adherent to the windpipe.

3. The parathyroids. In the connective tissue space between the two capsules the parathyroid bodies are usually found, and this fact alone gives great importance to a study of both the capsules and the intracapsular space.

Undoubtedly one of the most interesting chapters in the progress of surgery has been written in the experimental and clinical study of the thyroid and parathyroid glands. Indeed few triumphs of any kind equal the conquest of thyroid disease. Thirty-five years ago practically all cases of thyroidectomy died from early tetany or from later trophic changes. The real difficulty from the thyroid operation then lay in the parathyroid glands, for, because of the apparent insignificance of these structures, the danger resulting from their removal was not suspected, and was determined only by much experimentation and clinical observation on the part of such able men as Weiss-Biedl, Erdheim, Pineles and Kocher of Europe, while Thompson, Mayo, Beebe, Ochsner and others have been tireless and efficient workers in America. Early thyroid operators believed that death was due solely to the removal of the thyroid gland, and it was not until as late as 1902 that Jeandelize was able to state the real cause of tetany and death following thyroidectomy. In that year he made the statement at present everywhere accepted as a fact, that insufficiency of thyroid secretion causes chronic nutritional disturbances while lack of parathyroid tissue causes tetanic crises.

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*Read before the Middle and Western Sections of the American Laryngological, Rhinological and Otological Society, St. Louis, February 22, 1916.

The parathyroid glands are among the strangest structures of the human economy. Small and inconstant in number, often so small and hidden that they are very difficult to find even during the most careful dissection by experts, their actual importance as vital organs must not be overlooked. It has been proven repeatedly that death follows the complete removal of all the parathyroid glands in animals, including man. In some instances after supposed removal of all, death did not occur and it was thought, therefore, that there were exceptional cases. Further observations on these same animals showed, however, that one or more parathyroids had been overlooked in the dissection, and these had proved sufficient to carry on the life-sustaining function, whatever it may be. Subsequent removal of these remaining parathyroids in any such animals has always resulted in death from tetany, usually before the tenth day.

Investigators seem to agree that the normal, at least the most constant number of parathyroids is four, and that the average number in a series of examinations is less than four. The number according to competent authority may vary from one to eight. It is believed by some that when only one or two have been found in a given case that others were present, but because of the difficulty in finding them, were overlooked. They are usually located in the connective tissue between the glandular and the surgical capsules.

Berkeley states that the average size of the parathyroid glands is 6x4x2 mm. and that the greatest weight in any set of four glands, in 125 autopsies was 5.04 grains. The minute size, the shape and the color of these little organs make them difficult to distinguish from small lymph nodes and fat.

The surgeon must not, therefore ignore a thorough study of the relationship of the parathyroid glands to the field of operation in thyroidectomy. He must know and execute that procedure which will most certainly leave the parathyroid glands in place, and with the least possible amount of traumatism to the glandules or to their blood supply. Early operators almost invariably removed the parathyroids along with the thyroid gland, without knowing that they did so, and without knowing that to do so would certainly be followed by serious consequences. Thus it happened that a careful study of the thyroid gland after it had been removed, often led to the discovery that the little parathyroid glandules had been hulled out along with the thyroid gland, and were found clinging to the glandular capsules or lying in its covering of connective tissue. In such cases if only one or two parathyroids had thus been removed, but two or three more fortunately left behind, tetany was possibly avoided. Since the practice of removing all of the thyroid has now been abandoned the danger from tetany is much lessened for the obvious reason that, even though the operator followed a faulty technic regarding the preservation of the parathyroids, he would, of course, not remove these glands except on one side, leaving the glands of the opposite side intact and uninjured. It is nevertheless highly desirable not to injure or remove any of the glandules, and, by following the most approved technic, to so preserve them is usually possible. Kocher, Halsted, Mayo and others have devised safety methods, but the

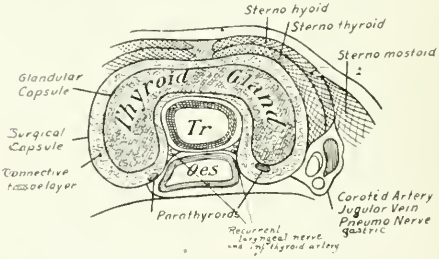

Fig. 1. Modified from Binnie ("Operative Surgery"); and from personal dissection by author. The relationship of every important structure is here shown. Note that the recurrent laryngeal nerve and the inferior thyroid artery have a sheath of their own, and lie entirely outside both capsules of the thyroid gland. This fact makes it important not to expose the recurrent nerve, in order to avoid its injury.

descriptions of such methods are not entirely clear, at least not to the beginner.

Lying as it does over the lower portion of the larynx and upper portion of the trachea within its capsules as above described, the thyroid gland or one or more of its lobes may be removed with both ease and expedition. If, therefore, a mere removal were all that must be considered the operation of thyroidectomy would undoubtedly be viewed with less concern than is at present the case. Surgeons are now fully aware that mere removal of the desired portion of the gland is not all that is required in the performance of this operation. Important and even vital structures which are difficult of recognition must not be injured or removed and hence greater skill is often required to avoid these difficulties than is necessary to accomplish the removal of the thyroid itself.

The chief dangers to be avoided in thyroidectomy are: (1) the anesthesia; (2) hemorrhage and shock; (3) suffocation from collapse of the trachea; (4) injury to the recurrent laryngeal nerve, and (5) injury to or removal of one or more parthyroid bodies. In addition to these there is always grave danger in exophthalmic goiter operations due to the toxic state of the patient, such persons being poor operative risks.

The question of hemorrhage, shock, anesthesia and the toxic state of the patient are well discussed in the literature and there is no occasion to take them up here. But how best to avoid suffocation from collapse of the treachea, to avoid injury to the voice from operative disturbance of the recurrent laryngeal nerve and, above all, to follow a procedure that will leave the parathyroid bodies intact, may I believe be discussed further with profit.

The fear of collapse of the treachea, resulting in suffocation of the patient should not seriously disturb any well-trained laryngologist. Such an occurrence is rare and its proper management requires only that a tracheotomy tube be handy at the moment the isthmus is dissected away from the trachea. Should collapse occur as a result of previous pressure and absorption of the tracheal rings, as shown by the disturbed respiration of the patient, the front wall of the trachea should be lifted up and incised and the tube inserted.

The method which I have followed in a considerable number of cases is, I believe, as free from the above dangers as possible. No claim of originality is made, but considerable research into the anatomy has been pursued with a view to clarifying if possible some points looking toward a safe technic in the surgery of the thyroid.

If the patient shows marked systemic disturbances, as in case of exophthalmic goiter, it is wise to secure the advice and cooperation of a skilled internist. The patient should rest in bed for a few days under the least exacting circumstances. The pulse should be reduced to or below 120, if possible. The preparation for the anesthetic is practically the same as for any other major operation. The neck should be sterilized by the use of alcohol and iodine. A piece of gauze one yard square should be placed over the head and the free ends brought down over the neck and chest where they are attached at some tension. A slit large enough to expose the field of operation is cut in the gauze. The patient's body is placed with the head up at an angle of about 30°.

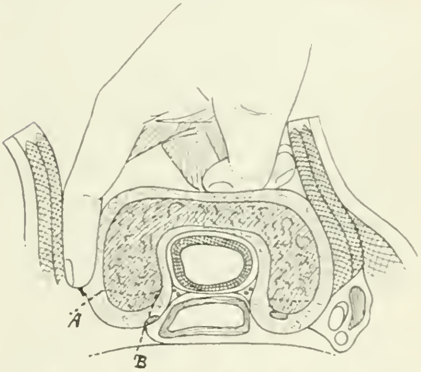

Fig. 2. Shows lateral finger dissection of gland to safety line, A B.

The Kocher horse-shoe incision is made through the skin and platysma and the flap reflected upward. A perpendicular incision is made over the center line of the trachea from the lower part of the thyroid cartilage downward to the fourth tracheal ring. This incision opens the surgical capsule, enabling the operator to insert the index finger under the sternohyoid and sterno-thyroid muscles, and, working thus in the loose connective tissue between the surgical and glandular capsules, to rapidly separate the whole of the anterior surface of the lobe to be removed from the structures which overlie it. The overlying muscles are then cut and turned back from the field of operation. The finger is next inserted under the superior pole of the lobe, and is carried downward along the side of the trachea, still working between the two capsules as far as the entrance into the thyroid of the inferior thyroid artery. Up to this point finger or other blunt dissection is safe and rapid, as no structure of importance is likely to be injured. Of course many superficial veins and the superior thyroid artery and vein must be ligated before this stage of the operation is reached, for the reason that immediate safety of the patient depends upon checking all blood as soon as any vessel is seen or severed. A dry field in which the operator may see all the essential steps of his work will reward him for his trouble in ligating even tiny arterial twigs, and the patient will be saved from inevitable shock due to any considerable loss of blood.

When the inferior thyroid artery is reached in the dissection the upper half of the gland is pulled outward and forward, and the artery is ligated as close to the surgical capsule as possible. At this time the operator should recall the position of the recurrent nerve and its relation to the thyroid artery inferior. Reference to fig. 1 will show that both vessel and nerve run between the trachea and the esophagus in a special sheath of their own, which lies outside the surgical capsule of the thyroid gland. The nerve continues outside the capsule throughout its course, whereas the artery penetrates the surgical capsule and enters the gland through the intervening connective tissue. If, therefore, the outer capsule is preserved intact during the process of dissection, the nerve will most certainly be protected by it, while the artery may be clamped near the entrance into the gland substance and between the two capsules without risk of injury to the nerve. It is, I believe, a faulty procedure to make any attempt, as recommended by some operators, to expose the recurrent nerve during thyroidectomy for the purpose of avoiding its injury. In cases of malignancy of the thyroid where displacement of normal structures is the rule and where the thyroid tissue is closely adherent to its environment injury to the recurrent laryngeal nerve may at times be unavoidable. The point of entrance of the inferior thyroid artery also marks the limit of safe dissection in a downward direction since the posterior parathyroid gland lies in the connective tissue between the two glandular capsules and usually in close proximity to the artery. It may lie in a sulcus of the gland and would be removed along with the lobe should proper precaution not be taken. Hence when the finger dissection has reached the site of the artery one of two precautionary measures must be chosen to avoid injury or removal of the parathyroid glandules. Mayo advocates using a piece of gauze wrapped about the finger, using it as a brush applied closely to the glandular capsule in such way as to brush off from the thyroid lobe all the connective tissue "moss," and along with it, of course, the parathyroid glandules which are thus left behind in the wound, resting in their bed of connective tissue. This is a rapid method and when employed by one of great experience probably is entirely safe so far as the glandules are concerned. The plan which is most certain, however, in the hands of the less expert, is the one of cutting through the glandular capsule at a point above the location of the posterior parathyroid gland, and of leaving a small layer of the lobule in situ, as shown in figs. 2 and 3. It will be clear on study of these figures that by following this procedure the parathyroid glands must be left unharmed, while the risk of injury to the recurrent laryngeal nerve is minimized.

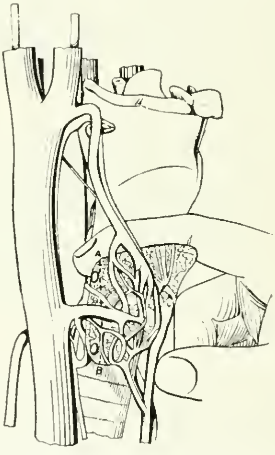

Fig. 3. Showing displacement of lobe forward by finger dissection between the capsules. Note the position of the parathyroid glands. The line A.B. indicates the incision through the glandular capsules, and the amount of glandular tissue left to make sure of safety to the parathyroids. Finger dissection may safely be carried out to point A.

Following the plan of ligating all bleeding vessels immediately and of working between the two glandular capsules as here described, the chief dangers incident to the operation itself may be avoided. In simple goiter, where the patient is not otherwise seriously affected, my personal belief is that the removal of one lobe and the isthmus of the thyroid is about as safe as is the average case of adult tonsillectomy, and that practically all patients should be expected to recover. In exophthalmic cases, however, in which symptoms of hyperthyroidism are severe the outcome is not so good. But even in this class of case if the patient is well prepared for operation by rest in bed, freedom from all excitement and reduction in the heart rate a majority may be operated upon with the full assurance that the previous toxic symptoms will in time disappear, often rapidly, and that recovery will, in due time, occur.

CATARRHAL DEAFNESS — ITS LOGICAL TREATMENT.

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When one considers the handicap to the individual and to society, of partial or complete deafness, it is amazing that so little attention is paid to its prevention and treatment.

For the purpose of this discussion we shall not consider deafmutism, hereditary or acquired syphilis, tuberculosis, oto-sclerosis, meningitis, congenital malformations or new growths, but consider the everyday problems in deafness.

Beginning at birth the eustachian tube, middle ear and labyrinth may be subjected to those pathologic changes which result in deafness, partial or complete.

There are two groups under which we may profitably consider the pathology of deafness as above defined. First, the mechanical or anatomical group, and second, the inflammatory or infectious group.

Under the anatomical or mechanical group we need to consider those departures from the normal structurally which bring about abnormal conditions in the organ of hearing. The eustachian tube, at birth, is open and should remain so throughout the life of the individual. The eustachian tube is one and one-quarter inches in length in adult life, and at birth its length is nearly the same. While it is true that its lining wall is normally in contact, the lumen is sufficiently open to admit of the free passage of air at all times. We must have the same air pressure within the middle ear as in the external auditory canal. The slightest departure from this constitutes a mechanical etiological factor in the production of pathologic changes within the middle ear. The extent of the pathologic change is in direct proportion to the extent and the duration of the mechanical blocking of the tube. A slight blocking of short duration results in dilatation of the capillaries of the middle ear and drum of the first degree. A single attack of this kind will leave nothing to show for it. That is, we are not able to detect any permanent change. Repeated attacks of this character leave their mark and eventually bring about pathologic changes in the middle ear and drum which are readily detected and most certainly lead to impaired function.

It is such attacks as these I wish to emphasize, as they readily escape attention. The patient may not be aware of such an attack or he may notice a feeling of fullness in the ear. The examiner may find only a minute dilatation of a single capillary on the membrana tympani and little or no impairment of hearing may be detected. If there is mechanical blocking of longer duration and more marked in character there are the same pathologic changes in the middle drum, but they are of such a character as to excite the attention of the patient and lead to investigation. If the investigator recognizes the condition and institutes proper treatment, the hearing will be saved, otherwise it will be impaired to greater or less degree depending on the behavior of the eustachian tube. The thickening and retraction of the drum and marked depreciation in hearing may be the result of eustachian tube blocking of first degree and intermittent type, and this may be the only direct etiological factor. It is possible to have edema of the lining of the middle ear, with exudation due to continued blocking of the tube, without infection. This, however, is of rare occurrence. In some cases it is difficult to draw the line between the purely mechanical cases and those that have blocking of the tube with infection of the tube and middle ear. I refer to the first and second stages in the inflammatory or infectious group.

All of the cases coming under this group can be cured. They should be recognized early before the damage is done to the middle ear and eustachian tube They constitute a large percentage of our cases of deafness. Mechanical blocking of the eustachian tube of this type, is invariably due to pathologic conditions in the nose or naso-pharynx or pharynx, or all three may be at fault. Pathologic tonsils may also be the cause, and the only cause. The treatment of these ears divides itself into two groups: It consists in complete removal of all etiological factors and the relief of the local condition in the tube. The details can best be considered following the description of the second group.

The infectious or inflammatory group includes all those cases in which, as a result of bacteriological invasion, there are pathologic changes in the eustachian tube, middle ear, membrana tympani and labyrinth. One or all of these may be involved. The simplest type is confined to the eustachian tube where there may be congestion alone, or this may be followed by serous exudation, and this again by the purulent stage. A mild attack may subside and leave a tube not mechanically impaired, but the severer attacks always leave an impaired tube. During the attack the treatment is confined to securing a patent tube and promotion of drainage towards the naso-pharynx. This is done by applications of astringents to the mucous membrane surrounding the opening of the tube, and instillation of cocain and adrenalin within the mouth of the tube, followed by the instillation of argyrol. This must be done with exceeding care and only by someone familiar with the technic. Inflation of the tube is absolutely prohibited. The nasal passages are to be kept open and the nose should be blown only gently and in open fashion. When the acute attack has entirely subsided, and the eustachian tube is free of all infectious secretions, inflation with the catheter may be performed, but very gently at first, and instillations and bougies may be used. The object of the treatment is to prevent constriction of the tube, to restore its normal patency.

Whenever there is such an involvment of the tube, there is always a secondary effect on the middle ear and drum. If the pathologic process is limited to the tube, there is only the result of the blocking. When the infectious process invades the middle ear, there is a much more serious condition to deal with. The construction of the middle ear is such that one cannot have an infection of even the slightest degree without serious damage resulting. If only the stage of congestion is reached the patient is comparatively well off. It may subside without leaving damage that cannot be repaired with treatment. Here again the same treatment as that employed for the tube inflammation is used. If the stage of exudation is reached there are sure to be some adhesions and deposits which we may not be able to remove by treatment. We can only employ the measures already mentioned. If we are successful in getting drainage early through the tube the damage may be slight, especially if the treatment is followed up in the way above mentioned. We must not inflate these middle ears until all fluid exudate has either been drained through the tube or absorbed. We must not incise the drum in these cases when we have only this stage to deal with. The borderline between these cases and the next class, is not always easy to determine. When in doubt paracentesis is the safest procedure. Remember that paracentesis means the introduction into the middle ear of infection through the external auditory canal. With a perforated drum we have the added danger of blowing infectious secretion from the nose and naso-pharynx into the eustachian tube and middle ear. This may be responsible for added infection, and even mastoid involvement.

The third or purulent stage calls for immediate opening of the drum. This should be well done—not a pin prick somewhere in the drum, but a deliberate incision in the posterior inferior quadrant, beginning at the floor of the canal and carried up to the posterior fold. Whether we insert a sterile gauze drain or institute douching, depends on our opportunity to attend the case personally. Before incision the canal should be carefully cleaned with alcohol. With a purulent infection of the middle ear and drum the eustachian tube may be damaged as well. Much depends on the early drainage and prompt subsidence of the infectious process. Permanent perforations in the drum are, with few exceptions, the result of neglect or faulty treatment. If there is a permanent hole in the drum it is better for the ear if the tube is permanently closed. The treatment of these ears, after the infection has subsided and the drum has closed, is important. The eustachian tube should be restored to its normal patency, and gentle and frequent massage with catheter should be instituted before the deposits and adhesions within the middle ear become well organized. A discharging ear and adenoids should not be found in the same patient long after coming under observation. All the foregoing is simple straightforward practice and everyone is familiar with it. Let us ask ourselves if all of the foregoing conditions receive the treatment they should receive. If they did would we see as many damaged ears as we now do? The involvement of the labyrinth constitutes a distinct class and the limits of this paper will not permit its consideration.

From birth to the end of life, the nose, nasopharynx, pharynx and fauces are a potential menace to the ears. There is scarcely an acute infection of any type that does not involve the upper respiratory tract. In every instance an extension to the eustachian tube and ear is possible. In the presence of such acute infections it is our imperative duty to keep a daily watch of the ears and be ready to conserve their function by prevention of involvement when possible and by proper treatment when involvement takes place. The so-called cold in the head is not to be belittled. It is a serious matter and has caused more cases of deafness than any other one cause. Any anatomical malformation in the nose that conduces to acute or chronic infection of the nasal passages proper or the sinuses, is a possible constant factor in the production of impaired hearing. Adenoid and tonsil hypertrophy and infection are likewise a source of ear trouble. Nasal obstruction of minor degree without infection may be the only cause and should receive proper attention.

The crux of the whole matter is this—any pathologic condition in the upper respiratory tract increases the chance of impaired hearing in direct proportion to the extent and duration of the pathologic condition. Prevention is the watchword. I do not believe that the importance of the nose and throat as etiological factors in the production of deafness is adequately appreciated. It may be theoretically, but it is not in actual practice. In how many of our clinics and hospitals is there any attempt made to correlate the treatment of the ear, nose and throat cases? The rule is to have one department for the ear presided over by a group of men, and another for the nose and throat presided over by an entirely different group of men. The patient does not get a square deal unless he secures treatment instituted by someone who has obtained a complete clinical picture of the case. When we have amalgamated our ear services and our nose and throat services, we will have made a creditable advance. I am constantly seeing patients that properly belong in the two groups which we have discussed in this paper and finding on examination that they have pathologic conditions in their upper respiratory tract that are entirely responsible for the initiation and continuance of the ear involvement. So many of these have received medical care either in the clinics or in private practice that one wonders how the underlying etiological factors escaped attention. There is not an ear, nose and throat man properly grounded in the pathology of these ear conditions who does not recognize the simple facts mentioned in this paper. We want more men who will diligently apply themselves to their chosen specialty and fewer men who work at it.

There are too many deaf people. It is a disgrace to the medical profession, for we are really responsible for the greater number of cases of deafness. I appreciate that there are many hopeless cases, many that could not have been prevented. For instance a child becomes infected with a virulent scarlet fever infection, and within twenty-four to forty-eight hours the entire middle ear is destroyed beyond repair. I believe the time is not far off when the simple mastoid operation will be done for the purpose of saving the middle ear. If we can open the mastoid and drain the middle ear, thus saving the ossicles, drum and the hearing, is it not better than allowing the middle ear infection to continue with a resultant destruction of hearing? It has been estimated that among the school children in New York City, one in every hundred has sufficient impairment of hearing to be a handicap in school advancement. There are in New York City 1,000,000 school children and among them there are 10,000 children who have, in the great majority of cases, the type of deafness considered in this paper. It is with this class that we have the best opportunity for doing satisfactory work. The physician who guards the medical welfare of the family, is the one we must look to, to discover these cases and see that they receive adequate treatment, for often the specialist sees them too late.

NOTES ON THE DIFFERENTIAL DIAGNOSIS AND TREATMENT OF APPENDICITIS.*

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When the question arises as to the cause of severe abdominal pain, an examination of the blood should be made. If a distinct leucocytosis is present, the white cells of the polymorphonuclear group being increased, it is indicative of an acute inflammatory process somewhere within the body, and probably in the appendix if the symptoms are appendicular. It is, however, a great mistake to decide to operate upon this sign for it has at times proved unreliable; it is to be regarded as collateral and not as direct evidence of appendicitis.

One of the most important differentiations for the physician and surgeon is that between appendicitis and early typhoid fever. At first glance this would seem to be easy, but those of experience know that it is often difficult. Not that typhoid fever often develops suddenly, but that appendicitis may develop slowly during a mild influenzal infection, or during an attack of gastrointestinal catarrh which has been obscure in its nature. Besides, the lymphoid tissues of the appendix and nearby parts are usually involved in typhoid fever, and may cause appendicular symptoms. These localized typhoid lesions may cause pain and tenderness in the right iliac region. The absence of very severe pain, the failure to find the leucocytosis of acute inflammation, the peculiarly coated tongue, the presence of tympany, and the later development of rose spots and the Widal reaction will prove the case to be one of typhoid fever.

Care should be observed that pain and swelling in this area occurring in one who has tuberculosis is not mistaken for appendicitis. Frequently we find these signs in consumptives who are by no means far advanced in their disease. The condition is usually one of local tuberculous infection of a chronic type.

Appendicitis is separated from hepatic colic by the history of previous attacks, by the absence of jaundice, by the absence of tenderness over the gall bladder, and by the fact that in gall stone colic the pain is referred to the chest, between the right shoulder blade and the spine; whereas, in appendicitis it is not so referred.

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*Read before the West End Medical Society of Louisville, Ky., February [illegible]

Renal colic is differentiated from appendicitis by the pain being referred to the testicle, pelvis, or the inside of the thigh; by the fact that the urine contains blood at least microscopically; there is no excess of pain and pressure over "McBurney's point;" and there may be a previous history of renal stone. Irritability of the bladder is of no value as a differential sign, as it is often present in both renal colic and appendicitis.

Ovarian or tubal inflammation may resemble appendicitis, but a pelvic examination will usually reveal these conditions.

In some cases of intestinal obstruction the pain may resemble that of appendicitis, but the presence of obstinate constipation, the development of fecal vomiting, and the presence of a mass in the belly elsewhere than at the appendix, may enable the physician to make a differential diagnosis.

The possibility of acute hemorrhagic pancreatitis being present is to a large extent excluded by the fact that it is a very rare condition, and by the site of the pain and the onset of early collapse in this disease.

The possibility of mistaking a right-sided pneumonia for acute appendicitis is to be remembered as of great importance. In certain cases of such pneumonia, probably cases complicated by diaphragmatic pleurisy, there is complaint of pain in the region of the appendix, with tenderness upon palpation and rigidity of the right rectus, a group of symptons very suggestive of appendicitis. It may be twenty-four hours or longer before the development of characteristic physical signs make the diagnosis clear. In pneumonia we look for more rapid pulse and respiration, disturbance of the pulse-respiration ratio, some movement of the alæ nasi, cough, even if slight, some limitation of motion on the affected side, and a more continued and higher fever than belongs to a beginning appendicitis.

Occasionally rheumatic children will show rigidity of the muscular walls of the abdomen. Such cases are without temperature elevation and the symptoms are not persistent.

Treatment: There is perhaps no more difficult point for decision in medical practice than that as to the treatment of appendicitis. It is impossible to discuss the vast array of arguments for and against early operative intervention in this brief paper.

Given a case of appendicitis of the acute type, the first thing for the physician to do is to call in a surgeon as a consultant, not merely as an operator, provided a surgeon qualified to do good abdominal surgery, if it is required, is obtainable. If none such can be had, the patient is far better off without than with operation. If by medical treatment the case can be controlled and carried through the acute attack, the surgeon should not intervene, for the mortality of operations in the acute stage is far greater than where the operation is performed in the interval between attacks.

Seventeen years ago Fitz showed that 40 per cent. die after surgical measures, and 11 per cent. after medical treatment. At present the percentage of deaths in surgical cases are far less, chiefly because the cases are seen early enough or operation is performed at the time of election; but even at a much later date than that of Fitz's paper we find Coley (1899) recording 98 medical cases with 3 deaths, and 102 surgical cases with 22 deaths. When we consider Sprengel's statistics of 516 cases, 232 of which were operated upon in the interval with two deaths, and 284 during the attack with 57 deaths, the value of *delay in mild cases at least* is evident.

The plan of treatment in mild cases is as follows: The patient is required to take absolute rest in bed. An ice bag is placed over the appendix. No purgatives are given, no pain-relieving drugs are to be used unless the pain is excessive, when enough morphine may be used hypodermatically "to take the edge off the agony," but never enough to make the patient comfortable or to make him sleep, for such an effect masks the symptoms. No food is to be given by the mouth, and no drink is to be taken. If need be, liquid can be given by hypodermoclysis or by rectal injection. If the bowels move, a bed pan must be used. If the pulse is excitable, it may be quieted with a little aconite.

Under this plan of treatment the acute inflammatory process may be arrested, and the operation can be performed, if need be, after it has subsided. If at the end of thirty-six hours the symptoms are not rapidly subsiding, it is necessary to operate at once. Fowler has shown that when operation is performed in forty-eight hours 83 per cent. recover; when the cases are left to the fourth day 60 per cent. recover; to the fifth day 58 per cent.; to the seventh day 50 per cent; and to the ninth or tenth day only 33 per cent.

The signs, however, which will force the surgeon to immediate operation when the patient is first seen, or if he does not improve under treatment, are: great rigidity of the rectus muscle, persistent vomiting, a rapid pulse (above 110), an anxious countenance, and, perhaps, as an indication of some importance, a high leucocytosis. In such cases the only salvation of the patient lies in immediate surgical intervention, and each hour of delay diminishes the chance of recovery. The whole question is one of severity of infection. If there is reason to believe that the tissues are becoming infected, and that the system cannot resist the spread of the inflammation, then we must operate.

The question of deferring operation to the interval between attacks is still under debate. There are some radicals who insist that operation should be resorted to without waiting, and indeed before the appendicitis is severe. There are others who are content to wait until the storm is past, and still others who believe that, given a patient who has had but one attack of moderate severity, he may go free until another or a third attack makes it evident that a recurrence is likely to take place at any time, when she should be operated upon in the interval.

As Dennis well says: "The plan of allowing the simple catarrhal cases which are doing well after thirty-six hours to recover without immediate operation, and relegating them subsequently to the group known as interval cases, and the prompt operation after thirty-six hours when the cases are not doing well, seems to hold out the best *prospects* of recovery. The pendulum has swung too far toward indiscriminate operation. But now the introduction of the interval operation has brought the pendulum back to swing within the proper limits."

THE SURGEON'S RESPONSIBILITY.

The surgeon who hesitates to direct the necessary treatment is like the general who abandons his place on the eve of a battle or like the fire chief who retires from the ground when he finds there is a real conflagration. The surgeon has no right to allow this responsibility to rest on the shoulders of any other person, it matters not how broad these shoulders may be. He must never act purely on any other person's say so however eminent, positive or persuasive that person may be. The surgeon's own shoulders should bear the burden and he must see to it that they do.

It is the mandate of our calling that it shall be so. This mighty responsibility is a splendid dignity. If a surgeon's shoulders are not sufficiently broad, strong and able to carry great personal responsibility, such a man belongs to some other calling. The trials and triumphs of surgery should not be for him.—J. Chalmers da Costa in the *Pennsylvania Medical Journal*.

THE NERVE SUPPLY OF THE LOWER ABDOMINAL WALL AS RELATED TO THE PFANNENSTIEL INCISION.*

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It is well recognized that in any abdominal incision it is most important not to injure the nerves supplying or crossing the cut structures, since such nerve injury predisposes to hernia by causing paralysis of muscle or atrophy from disturbed nutrition or loss of sensation.

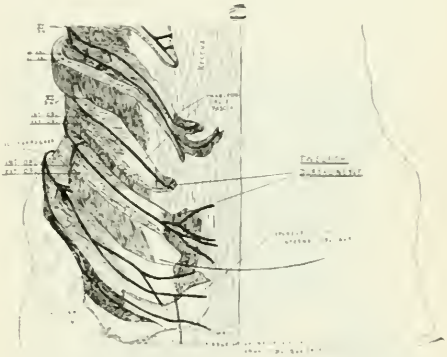

Fig. 1. Shows the nerve supply of the anterior abdominal wall below the umbilicus. (Modified from Houget.)

The nerves concerned in the Pfannenstiel incision are the anterior divisions of the twelfth dorsal and the hypogastric branch of the first lumbar. The twelfth dorsal nerve leaves the spinal canal below the last dorsal vertebra and rib, running at first behind the psoas muscle and in front of the quadratus lumborum. It pierces the transversalis and passes between it and the internal oblique two inches above the iliac spine in a downward and inward direction to the edge of the rectus where it pierces the sheath and runs behind it to about the middle of the belly of the muscle. It pierces the muscle and the anterior rectus sheath, some branches becoming cutaneous and supplying the skin below the umbilicus. It also supplies branches to the transversalis, the internal and external oblique, the rectus and the pyramidalis muscles.

The hypogastric branch of the first lumbar nerve runs between the transversalis and internal oblique about an inch above the crest of the ilium, it continues downward and inward parallel to the twelfth dorsal, pierces the internal oblique about an inch in front of the anterior superior iliac spine and lies about half an inch above the inguinal canal under the aponeurosis of the external oblique, pierces the aponeurosis of the external oblique an inch and a half above the external inguinal ring, becomes cutaneous and supplies the skin above the pubes below the level of the twelfth dorsal. It gives off branches to the transversalis, oblique, and pyramidalis muscles.

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*Read before the New York Academy of Medicine, Section of Gynecology.

The ilio-hypogastric is not usually seen in the Pfannenstiel incision, as it pierces the external oblique above the external ring and is retracted with the lower flap. At times muscular branches to the rectus are found when the lower flap is retracted. All the anterior divisions of the lower dorsal and first lumbar nerves are double, each nerve supplying a definite section of abdominal wall.

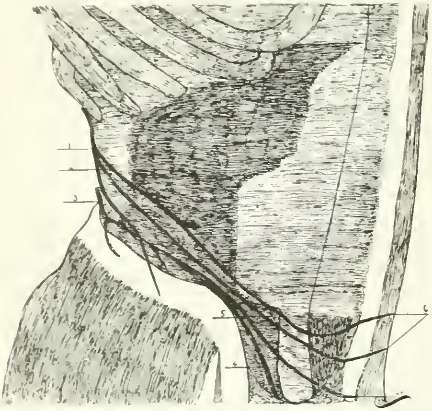

Figure. 2 The anterior divisions of the twelfth dorsal, the hypogastric, and the inguinal branches of the first lumbar. (Adapted from Spatteholz.) (1) 12th dorsal nerve; (2) m. transversus abdominus; (3) ilio-hypogastric nerve; (4) ilio-inguinal nerve; (5) m. obliquus internus; (6) anterior cutaneous branches of 12th dorsal nerve.

In the Pfannenstiel incision, after the aponeurosis has been separated from the muscle and the linea alba divided and the upper flap retracted, two or sometimes four large nerves can be seen coming up from the recti about an inch from the median line and piercing the anterior fascia. These are the anterior divisions of the twelfth dorsal nerve. They are often half as thick as a match, double, and accompanied by a bloodvessel. They should not be cut, as in retracting the upper flap they can be drawn out sufficiently in nearly all cases. If scissors are used to separate the sheath from the rectus muscle, these nerves may be mistaken for connective tissue and cut. I think this will account for some of the cases of hernia that have been reported as following a Pfannenstiel incision. For years I have demonstrated these nerves to the students at the Polyclinic, and if looked for they are seen in every operation.

The upper part of the anterior division of the twelfth dorsal nerve is not seen and, if care is taken to split the oblique muscles in the direction of their fibers, there is no danger of cutting it even with the extended incision used in large tumors. When a very large opening is required, the incision through the skin can be made from one spine of the ilium to the other. The incision through the aponeurosis is then prolonged over the lateral edge of the rectus muscles and the oblique muscles are split along the line of their fibers, if necessary out to the iliac spine.

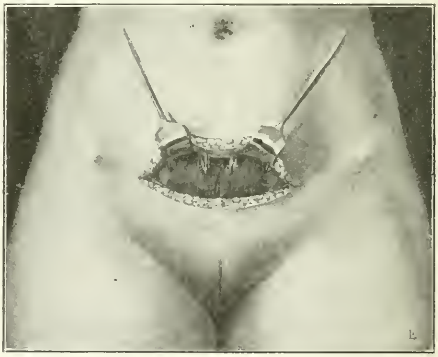

Fig. 3. Shows the incision with the anterior branches of the twelfth dorsal nerves, coming out from the rectus muscle and piercing the aponeurosis covering the muscle.

The detachment of the aponeurosis from the recti can be effected upward as far as the umbilicus and downward as far as the symphysis, the pyramidal muscles remaining upon the flap of the aponeurosis. The recti muscles are separated and the peritoneum severed in the midline.

This provides a very large opening suitable for the removal of the largest tumors and making it easy to operate deep in the pelvis. For a smaller opening, the incision is made in the pubic fold which occurs in all women at all fat. It should be made almost straight with only the slightest curve, not crescent-shaped as it is often described. In young women when a small incision is all that is needed, the skin incision can be made below the line of the pubic hair; the skin and fat are then pushed up and the aponeurosis divided at a higher level. There is no danger to the bladder if the peritoneal incision is started high, and in cutting toward the pubes one knows when he is near the bladder by the thickening of the tissue and the little bleeding points encountered. It makes little difference in medium-sized incisions whether the pyramidales are left attached to the rectus sheath where they act as tensors of the fascia, or are separated and left on the recti, or whether the peritoneum is entered at the outer side or between them. Hemostasis should be carefully looked after before closing the incision; hematomata are apt to form if this is not done. At the clinic we have used this incision even for large tumors and in infected cases and find that it heals with less danger of hernia than the vertical incision even in the presence of infection.

The Radical Operation for Cervical Carcinoma.

The exact extent of the growth should be determined before proceeding with the operation. I believe that this is a very important step, for if I had used better judgment at this time and had refused to attempt the impracticable my percentage of cures of those surviving the operation would have been just as great and the primary mortality would have been reduced from seven to two. Five of the seven patients who have died should not have been operated upon. I believe that posterior and lateral extension of the disease which fixes the cervix and cannot be palpated around, hydro-ureter and extensive metastases are contra-indications for operation. The primary mortality is high in this group, and the growth has recurred in all that I operated upon who have survived the operation.

The object of the operation is to free the lower end of the ureters, the bladder and the rectum in order to draw them to one side so that they may not be injured and also to enable the operator to obtain the widest possible excision of the tissues about the cervix. This is the tissue which is first involved, both by direct extension of the disease and also by metastases. The wide excision of the tissues about the uterus above the level of the internal os is of very little importance, for they are rarely involved in an operable (curable) case. The body of the uterus, the tubes and ovaries are also rarely involved. I have never found either the tubes or ovaries involved, and the body only in cases so far advanced that they should not have been operated upon, and that very rarely. The body of the uterus, tubes and ovaries are removed together with the cervix, not because the procedure is of any great curative value but mainly for technical reasons.—John A. Sampson in the *N. Y. State Journal of Medicine.*

SOME OF THE USES AND ABUSES OF NORMAL SALINE SOLUTION

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The effort to supply the blood stream with something to increase its volume, when the volume had been lowered by hemorrhage, represents a very ancient procedure; and that something was blood from another member of the family or of a friend who was sufficiently interested to donate the necessary amount of life-fluid.

As early as 1492 A. D., Pope Innocent VIII was given an intravenous transfusion of blood, the donors being three boys. This effort was, like many subsequently, unsuccessful, and not until the middle of the seventeenth century did transfusion become a recognized surgical procedure.

In 1666, Lower wrote the first detailed account of blood transfusion. Soon afterward, Denys, in France, reported three successful cases. As this work was merely regarded as a curious experiment, after several attempts it was quite deservedly abandoned until the nineteenth century.

Quite naturally, when failure met the efforts of the earlier clinicians they turned their attention to something which would supply the volume, yet easier than blood itself to obtain and administer, and most important of all safer both from a surgical point of view and from the fact that it did not subject the patient to the danger of disease which might exist in the donor. For a while milk and other albuminous fluids were used, but these were soon abandoned. While in isolated cases infusions were performed earlier, not until 1881—when Schwartz methodically described its use—did we possess any reliable data concerning the use of a fluid to take the place of normal blood. This fluid was found to be a 0.9 per cent saline solution, this strength approximately agreeing with the tonicity of the blood—the only property of the blood sufficiently well understood to be imitated at the time the solution was devised.

Since more has been learned of the blood as a whole, including its various constituents, physiologists have vastly improved the original solution by taking into account the other inorganic salts besides sodium chloride. Saline solutions such as those of Ringer, Locke, and others, which have almost entirely replaced the ordinary sodium chloride solutions in physiologic laboratories, conform more closely to the inorganic constitution of the blood; nevertheless, these advances have not to any great extent been utilized in practical medicine. It is a well-known fact that the addition of potassium and calcium to the saline solution improves it much when used to maintain rhythmical contractions in the isolated heart, and there is little doubt that the efficiency of saline solution would be increased were they more generally employed in everyday medicine.

The addition of colloid material, such as gelatin and gum arabic (the latter in two per cent strength) to increase the viscosity, has not proven of service. However, the addition of dextrose to Ringer's solution has proven of value. Tablets of this combination may be procured from the manufacturing pharmaceutical houses, and the solution will have a specific gravity of 1009.

Since even in the hands of the most proficient, the transfusion of blood carries with it many difficulties and is not free from risk, is it any wonder that the profession should seek some other agent which will meet the demands; and is it any wonder that an agent used so frequently, possessing the virtues it does, should likewise be potent for harm? It is not my purpose to decry the intravenous use of saline solution, but to indicate some of its uses and call attention to the possibilities of doing harm, even producing death, by its indiscriminate employment.

How often have we heard the remark "give him saline solution, it can do him no harm!" This has perhaps been brought about (a) by the knowledge that sodium chloride forms an important part of the body fluids, and that salt is found in liberal quantity in nearly all our foods, where, however, it is changed to the lactate of sodium by the lactic acid thereby setting free hydrochloric acid (Hare: Practical Therapeutics), and (b) by the belief that the kidney glomeruli have no limitation in their capacity to excrete water and the chlorides.

The large field of usefulness for sodium chloride, together with the ease which it can always be produced, so illuminated our therapeutic vision as to blind us to its dangers, and not until some fatalities were reported did we realize that the pendulum had swung too far. Rossle (*Berliner klinische Wochenschrift*, No. 37, September, 1907) called attention to conditions found at autopsy by which he was able to diagnose previous saline infusions. The heart looked cloudy, rather dilated, moist and friable; the blood was thin, the clots watery and yellow in color; the bowel contents were watery; the bladder was found empty, and in some cases ascites was present. Brooks (*Archives of Internal Medicine*, vi, 577, 1910) reported a fatality following the accidental use per rectum of a concentrated stock solution of sodium chloride post-operatively. This was followed in 1911 by Evans, of San Francisco, in an article read in the section of Pharmacology and Therapeutics of the American Medical Association, on the Abuse of Normal Salt Solution, in which he reported several fatalities, and cited liberal quotations from others holding the same views. Geyser, of New York (*American Medicine*, January, 1914), again called our attention to its dangers, which conforms to the remarks made by Hare in *Progressive Medicine*, showing that careful study reveals the fact that we have been just a little lax in watching our results with this popular remedy.

Uses: In surgical practice salt solution attains its highest degree of usefulness in the treatment of hemorrhage, first to replenish the circulating medium, second by refilling the bloodvessels and thereby permitting the mechanical acts of the circulation to proceed. Again, in shock where, by the addition of adrenalin 1-20,000 to 1-10,000, the effects are quickly obtained when the solution is administered by the intravenous method; the heart and bloodvessels are stimulated so that blood which has accumulated in the large abdominal vessels is again put in active circulation. If urinary excretion is small and the kidneys are not diseased, saline solution furnishes a remedy which increases renal activity; the function of the skin is also markedly enhanced. Last, but by no means least, is its use in sepsis. The Fowler position, saline proctoclysis, the use of iodine and saline within the abdomen to convert the peritoneum from an absorbing into a secreting surface, will save many patients whose condition would otherwise be hopeless.

It cannot be said that the action of salt solution has been elaborately studied. It seems well established, however, that while it increases the volume of blood and lessens the specific gravity, it at the same time stimulates the cardiac ganglia and arteries, and accelerates the circulation. The increased arterial tension furnishes more nutrient blood to the heart through the coronary arteries, and in like manner stimulates the nerve centers. All the organs are made to do more work, especially the skin and kidneys where elimination must take place, a point that it is well to remember in its use.

Saline solution may be used in several ways: (a) by injection into a vein (intravenously), (b) by injection into an artery (intra-arterially), (c) by injection beneath the skin into the connective tissue spaces, as under the breast or over the abdomen (hypodermatoclysis), (d) by injection into the rectum and colon (proctoclysis), (e) by leaving a quantity within the abdominal cavity after celiotomy. The late Dr. Dawbarn insisted upon using it at 110° to 120° F.; this temperature is perfectly safe when we remember that globulin coagulates only at 158° F., and serum albumin at 162° F., and that experimentally 165° F., has been well borne by the dog. The heat acts as a stimulant to both heart and bloodvessels, a point of advantage to the obstetrician in making hot uterine injections for postpartum hemorrhage, and one to be remembered by the general surgeon in his treatment of shock by saline infusion. Under these circumstances there is a sufficient amount of blood to meet the requirements, if it can be kept in circulation. Here, the solution should be used intravenously at a temperature of 120° F. in small quantities often repeated, rather than in one or more rather large amounts, to avoid overwhelming the heart. This is in striking contrast to the amount required in dealing with the results of hemorrhage, where death may occur from an absolute loss of blood, not enough remaining to support the vital functions even though it could be kept in active circulation; death here occurs from interference with the mechanism of circulation, not enough blood remaining in the vessels to enable the heart and elastic arteries to transmit the force of the heart's contractions to distant portions of the body, and as a consequence the blood fails to complete the circuit and all centers suffer from anemia carried to the point of death. Hunter has said this would not occur, even though one-half or two-thirds of the total volume of blood was lost, provided the circulation could be maintained by supplying a fluid in place of the blood. He calls attention to the fact that in certain anemias the number of red cells may be reduced to ten per cent., or even less, of the original number, and yet little distress be noticed in respiration. It must be remembered, however, that such low reductions come about gradually, in contrast to the rapid anemia from hemorrhage.

In the preparation and use of saline solution in any case, and especially in the class just described, much depends upon the strength and composition of the solution and also the technic of its administration. The following facts have been proven relative to the merits and demerits of blood transfusion, and the use of salt solution: (a) that in the first instance the blood cells as such will not last for any length of time in the bloodstream of the recipient, and while transfusion is to be recommended in isolated cases it is far from generally practical and many of the best surgeons do not use it; (b) that saline solution is most useful because it does not destroy the remaining blood, and that the cells are rapidly supplied has been amply proven; on the other hand, plain water extracts the hemoglobin from the red cells and so acts as a poison, distilled water being highly toxic when used in the veins of the dog. This emphasizes the importance of care in preparation; too little salt causes the corpuscles to swell and lose their hemoglobin or they may even be completely destroyed, while too much causes them to shrink. To insure a correct solution tablets should be used, or a stock solution prepared by accurate weight. This stock solution should be sterilized by the fractional method of boiling—for ten minutes each day for two days, then fifteen minutes the third day; this destroys all spores and the method should be employed in hospitals where stock solution of double strength is used; after sterilizing it may be kept in glass containers. In the private home water from the old time tea kettle is sterile enough for practical purposes, also any water that has been boiled for ten or fifteen minutes and then strained. To this add a heaping teaspoonful of salt and four drachms of glucose to the quart, which will be near enough for any purpose save intravenous or intra-arterial use.

The technic of the various procedures which have been described for the introduction of saline solution is comparatively simple, and the necessary apparatus is readily improvised. For rectal use the ordinary fountain syringe may be employed, together with a rectal tube or a long and large catheter; a piece of rubber tubing, a funnel and a pitcher serve the same purpose; or the Davidson syringe may be used. When given by the rectum of course the scrupulous asepsis does not have to be observed, which is essential in the remaining methods to be described; but this feature is common to all, that the maximum stimulation to the circulation and the organism is attained only by a high temperature of the solution, as hot as the hand can bear, viz., 110° to 120° F. When the fluid is employed intraperitoneally, it is introduced at the last moment just before the final stitch is tied to close the peritoneum. For subcutaneous use the apparatus necessary is a good sized hypodermatic or aspirator needle, a piece of rubber tubing, a glass or metal funnel, or a fountain syringe. The fluid is allowed to flow from the needle, which is then plunged through the skin into the connective tissue about the thighs, beneath the breasts, over the abdomen, or about the neck; in fact, almost any convenient locality will answer. Of course, the skin must be made scrupulously clean before being pierced by the needle. An elevation at arm's length ordinarily suffices to make the solution flow into and distend the connective tissue; sometimes an elevation of six or more feet may be necessary.

As the fluid enters the skin pouts out, and when a tumor the size of a small goose egg has formed, it is wise to withdraw the needle and insert it in another place, meanwhile rubbing the tumor with the greased hand to favor speedy absorption. With usual precautions, this method is devoid of danger, and 500 c.c may be easily introduced under each mammary gland.

The intravenous method is sometimes difficult, especially to one inexperienced in general surgical technic. The trouble is that in many cases in which it becomes necessary to employ the intravenous method considerable hemorrhage has occurred, and the veins being collapsed are not easily identified. Usually a vein about the flexor aspect of the elbow is selected as most convenient; a superficial incision is made and the vein dissected free (in preference to introducing the needle through the skin), and a double ligature of small catgut passed beneath it: the vein is now partially severed and the proximal ligature tied. The solution having been previously prepared, is gradually introduced by means of a fountain syringe with the blunt pointed canula, or a large hypodermatic needle; a small-pointed glass medicine dropper will answer the purpose if nothing better is at hand. A sharp pointed needle should never be used, as it is likely to pierce the opposite wall of the vein, even if it primarily enters the lumen. The fluid is permitted to begin to flow, and while doing so the canula is inserted into the vein. This avoids the possibility of air being injected along with the solution, which, although undesirable, is apparently not so dangerous as many writers have assumed. For instance, Hare experimentally injected 40 c.c. of air into the vein of a dog so that it went directly to the heart, and no perceptible impression was made upon the circulation. Ordinarily it suffices to hold the container (preferably of glass) at the height of an arm's length, but it must be borne in mind that it is not desirable to have the saline solution enter the circulation too precipitately. Therefore, the canula should be of small size, preferably a hypodermatic needle; further, the flow may be very well regulated by elevation of the reservoir, i.e., holding it higher with a very small canula, and lower with a larger canula. Bovee states that probably the maximum amount which may be safely introduced into the veins or the subcutaneous cellular tissue is one ounce per minute. By slow introduction most of the alarming symptoms which have been observed to follow the injection of salt solution can be avoided; among these may be mentioned dyspnea, pulmonary edema, headache, vertigo, somnolence (probably from ventricular edema or cerebral hyperemia), mental excitement, delirium, and hallucinations. The more serious factor of overwhelming the heart has already been mentioned.

There remains to be discussed only the intra-arterial method proposed and practiced by Dawbarn in a few cases. Bovee only mentions the method to say it should never be used. Reilly states that "on account of danger of sloughing, the intra-arterial method is seldom used." Dawbarn contended that there was practically no danger of sloughing if the technic he described was used. This technic is as follows: The femoral artery beneath Poupart's ligament is located and fixed between the finger and thumb of the left hand; a hypodermatic needle, preferably of large size, is now pushed through the tissues into the artery. As the lumen of the artery will accommodate a lead pencil, Dawbarn states that it is not easy to miss it. As the needle enters the artery, "a bright red thread of blood wells up." The rubber tubing of a Davidson or fountain syringe is now slipped over the needle with the solution flowing, thus avoiding the introduction of any air; the Davidson syringe is now pumped, or the fountain syringe elevated six feet or more; the small size of the needle prevents the fluid from entering the artery too rapidly. In this way it requires about one-half hour to inject a pint of the solution. In support of the safety of this measure, Dawbarn cites the "needling operation" proposed by McEwen, of Glasgow, for aneurism, and employed with partial success by Wyeth in 1891. The aorta was pierced by thirteen needles, which were left in place twelve hours, and the operation was afterward twice repeated. Dawbarn argues, with some apparent reason, that if thirteen needles can be left in place in the wall of a diseased vessel for twelve hours, there would not seem to be much danger in leaving a single needle for a single hour in the wall of a healthy vessel.

The intra-arterial method is centrifugal, whereby the possible danger of the introduction of air is diminished; on the other hand, the intravenous method has the great advantage of carrying the infused solution directly and quickly to the heart, and so utilizing its heat for the maximum of stimulation to the circulatory organs.

One further use of salt solution is to be mentioned, viz., as an irrigating fluid for general purposes. It is believed to be less irritating than plain water, and, according to Verhoff's experiments, is a most powerful antiseptic because of its power to penetrate the deeper tissues.

In injuries where amputation is necessary the intravenous method should be used by injection into the open vein before the ligatures are applied. This method is much easier and, if needs be, quicker than trying to find and open a vein in the arm after the operation has been completed.

Abuses: Under no circumstances should saline solution be used in apoplexy, arterio-sclerosis, pulmonary edema, dilated right heart, threatened sudden death and sudden collapse from chloroform or ether narcosis, the last two conditions requiring more rapid measures. In the light of the present day knowledge, it should not be used in uremia.

In conclusion I desire to state that no more than fifty grains of salt per hundred pounds of body weight is required to kill a dog, and Lazarus Barlow has shown that if too large quantities be used a condition of hydremic plethora may be induced and the specific gravity of the blood reduced from 1064 to 1054. In an attempt upon the part of the kidneys and lymph channels to promptly excrete the excess of fluid, they "overshoot the mark" so that eventually the specific gravity reaches 1067 (Short: Newer Physiology in Surgical and General Practice). If elimination cannot be carried on fast enough, some degree of dropsy may occur, and as the Greenbaums have shown, it takes on the form of edema of the lungs; especially is this likely to occur in nephritic patients. Not more than thirty to forty ounces should be used at any one time, and this should be followed by further injections if need be to prevent reversal of effects.

Caudal Analgesia.

The chief advantages of caudal analgesia are: Extreme safety and absence of unpleasant or dangerous after-effects, as nausea, vomiting, pneumonia, etc. It has enabled us to operate on a class of patients in whom the risk of using general anesthesia would have been too great.

We have been so well impressed with the success of the method during six months' use of it that we believe it is destined to change largely the surgery of the pelvis, especially for the aged, feeble and decrepit. Prostatectomy is at once relieved of one of its greatest objections. The patient goes through the operation without shock, without nausea or vomiting, without menace to heart or lungs, and may be as comfortable after its performance as he has been before it.

The term analgesia as applied to this procedure has been used in preference to anesthesia. In many cases tactile sensation is not completely lost, though pain in the same area is entirely abolished. —Bransford Lewis and Leo Bartels in *The Lancet-Clinic.*

THE FIRST 118 CASES OF OPERATION FOR POSTERIOR DISPLACEMENT OF THE UTERUS.*

(Standardization of the Surgeon.)

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The classification of displacements of the uterus as anterior, lateral, posterior and downward is quite standard. I have had cases brought to me for operation for anteflexion, but in my personal experience I have found some other condition more satisfactorily accounting for the symptoms and I have, therefore, had no experience with demonstrable anterior flexion of the uterus. Lateral displacements are commonly a result purely of tubal and ovarian disease or pressure from some intraabdominal tumor. The classification of posterior displacements which seems satisfactory to the majority of surgeons the world over and which, therefore, may quite properly be called standard, is as follows:

1. Simple posterior displacement; the fundus backward in the cul-de-sac and the cervix forward occupying the upper and anterior portion of the vagina. 2. Backward and downward displacement with prolapse of the first degree: the fundus in the cul-de-sac; the cervix is visible at the vulva but does not protrude. 3. Backward and downward displacement with prolapse of the second degree; the cervix actually protrudes from the vulva. 4. Backward and downward displacement with prolapse of the third degree; total prolapse in which the fundus of the uterus actually protrudes beyond the vulva office.

Any one of these may be complicated by relaxation or laceration of the vagina with various degrees of rectocele and cystocele.

The diagnosis of displacement of the uterus must be based upon physical examination. In many women in whom displacement is discovered upon examination, there may be no subjective symptoms. The displacement may be intermittent, variable in degree and sometimes due to posture. I have observed a few cases of acute dislocation apparently occurring coincidentally with violent abdominal muscular effort and uterine jactitation in inexperienced young women.

The discovery of posterior position of the uterus during the course of an abdominal operation, when the patient is anesthetized and the abdominal and vaginal muscles relaxed, constitutes no basis for the belief that the uterus was displaced before she was anesthetized and the abdominal and pelvic muscles in a state of contraction. I shall not here argue the point nor bring up for debate the question as to whether or not simple posterior displacement of the uterus is of itself pathological and demands operation.

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*One of a series of papers entitled "Standardization of the Surgeon," read before the Tri-State Medical Society, Richmond Va., February, 1916.

The accompanying table enumerates the various combinations of displacements and other pathological conditions.

In my experience the most frequently associated demonstrable pathology in patients upon whom I have operated for posterior displacement have been inflammation of the cervix and body of the uterus or of the tubes, laceration of the cervix, cystic and prolapsed ovaries and disease of the appendix. Basing the diagnosis of inflammation upon tenderness visible redness of the cervix and visible muco-purulent discharge, I have found this condition in many cases. The patients have suffered pain intensified in comparison to what it was previously and with the flow appearing too soon, lasting too long, preceded and followed by muco-purulent leucorrhea. These are standard diagnostic signs, not of displacement but of inflammation.

In some cases abdominal pain occurring at menstrual periods has been quite properly attributable to the diseased appendix, easily demonstrable at operation. It is the expressed belief of a large number of abdominal surgeons that disease of the appendix is provocative of menstrual pain and that contraction of the uterus may be provocative of pain referable to the appendix. I have repeatedly expressed the belief that inflammation of the cervix and uterus and even of the tubes is frequently caused by the colon bacillus and other organisms gaining entrance from a focus of infection in the appendix, sigmoid and other parts of the bowel, as well as by the bacteria normally present in the vagina; and these probably frequently represent a metastatic implantation from remote foci of inflammation.

At any rate, observation of gross, easily visible inflammation of the cervix in virgins and others in whom clinical and microscopic examination satisfactorily negatized specific infection, has confirmed me in these beliefs.

Concerning the indications for operation I have been guided in the individual case by the standard diagnostic signs. The mere fact that the uterus is displaced constitutes no positive indication for its suspension. Displacement in the presence of inflammation, of lacerations, of prolapse of the ovaries, will not be replaced merely by tamponing, douching and the non-operative remedies employed. So that while the tables show that I have not performed many suspensions without at the same time treating other lesions, I would also emphasize that I have advised suspension in cases in which the uterus was displaced in conjunction with the treatment of the additional lesion present in the case.

Concerning the technic of operation, it is interesting to note that we have more methods and variations of methods than Heinz has varieties of pickles. There are now over a hundred different methods and modifications of methods. The best surgeons in the world have debated as to the best method of suspension of the uterus. Each qualified surgeon has secured satisfactory results. Many surgeons have performed many thousands of suspensions and it is scarcely conceivable that a thousand women would be operated upon by the same surgeon if to that surgeon and to those women the results were not satisfactory.

In the 118 cases that furnish the basis of this communication suspension was performed 117 times; in 30 of the early cases by the Gilliam technic; in some by the so-called Kelly method; in a few I used the temporary suspension of Ochsner and as a part of the treatment for extensive suppurative disease in one case the uterus was held up as a result of shortening the broad ligaments incident to removal of pus tubes; in one, hysterectomy was performed; in 83 cases of this group and all suspensions performed since I learned the method, I have employed the operation devised by Dr. Murat Willis of Richmond and which we have designated the Johnston-Willis technic.[1] This method has given me complete satisfaction. It conforms to the standard principles necessary in performing suspension, it produces no abnormality, and it is what I have called the anatomic method. It is followed by the least pain during convalescence and, above all, the end results, both as to position of the uterus and the relief of symptoms, have been perfect. All the cases have been followed at least three months and most of them examined again. I have had reports from patients and from doctors in many cases after from three to five years. Many of the women have had children since the operation without difficulty. Our patients, too, are perfectly satisfied with the Johnston-Willis technic.

Dilatation of the cervix was performed in all cases not because of actual stenosis (for I have met few cases which seemed to have organic cervical stenosis), but because so many cases needing suspension have also inflammation of the cervix and

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(1) Surgery, Gynecology and Obstetrics, June, 1912.

dilatation seemed beneficial in these. Curettage has been necessary in a goodly number of cases. This is not performed routinely, however, but only when there seems to be a gross pathological condition in the uterus. Repair work, either of the cervix or perineum or both, has been necessary in 58 of the 118 cases. Removal of the tube or of an ovary or of an ovarian cyst, in conjunction with suspension, has been recorded in 41 cases. In four cases, myomectomy was performed for subserous fibroids. The appendix has been invariably removed in every case in which the abdomen has been opened to suspend the uterus unless it had been previously removed. Seventy-eight cases showed disease of the appendix.

The additional operations which have to be performed upon patients on whom suspension was indicated, I regard as an important part of the treatment and they are tabulated.

There has been no mortality either from the disease or from the operation.

SUSPENSION OF UTERUS.

Total Cases	117
Suspension, dilatation and curettage	1
" ovarectomy and salping	1
" and append	1
" D and C and append	36
" " ovarect. and append	4
" " " myomect. and append	3
" " salping. ovarect. and append	1
" " " and append.	6
" " " and ovarectomy	2
" " " " exc. cyst and closure, faec. fist.	1
" " hernia. myomect. and append	1
" " cholecystotomy and append	1
" " salping. and append	1
" " " " and peri	2
" " " " " and susp. kidney	1
" " " " " and overect.	1
" " Append. peri. and hernia	2
" " " " and exc. hemorrhoids	1
" " " and perineum	1
" " " " and rep. cystocele.	4
" " and trachel	3
" " " " rem. ova. cyst	2
" " " " " " " and salpin	2
Suspension, D and C and Append and trachel. rem. ova. cyst and salpin and exc. hemor	1
Suspension, D and C Trachel	1
" " " and peri.	1
" " " " and append.	13
" " " " amp. cervix and append.	2
" " " " salping. and append	4
" " " " " ovarec. and append.	1
Suspension, D and C Trachel and peri. salping. ovarec exc. hemor and append	1
Suspension, D and C Trachel and peri. salping. ovarec. susp. kidney and caecum.	1
Suspension, D and C Trachel and peri. exc. ova. cyst and div. anus	1
" " " " exec hemorrhoids	1
" " " " append. lipect. overlapping abd wall	1
" " " " rep. cysto. append.	5
" " " " " " " and lipect.	2
" " " " " " and amp. cervix	3
" " " " " and amp. cervix susp ovary	1

DISPLACEMENTS OF UTERUS. I.

Total cases	118
Simple backward	66
Back and down (1st deg.) with lac. p.	36
" " (2nd deg.) with rect. and cyst	9
Comp. prolapse (fundus protuding) rect. and cyst	7
Disp. uncomp. with addit. patho	4
" comp. with demon. surg. path. of other abd. organs	114
" with inflam.	109
" " ovar. cysts and tumors	26
" " fibroid uterus	
" " lacerations	58

DISPLACEMENTS. II.

Disp. with pelv. perito.	1
" " " " and varic. of br. lig. and [illegible] bladder	[illegible]
" " " " " fib. [illegible] diast. recti	[illegible]
" " " " " float. kidney	1
" " " " " tube. tubes, [illegible] and pe[illegible]	1
" " " " " faecal fistula	1
" " " " " append. abscess	1
" " " " " append.	7
" " append. and gall stones	1
" appendicitis	3

DISPLACEMENTS. III.

Disp. with ova. cysts and cyst. ovary	26
" " " " " add. patho	23
" " " " " lac. cervi	3
" " " " " " " and pe[illegible]	5
" " " " " " " " " and append	3
" " " " " " " " " " cyst [illegible]. append	1
" " " " " " " " " float. kid. and caec	1
" " " " " " " " append.	1
" " " " " " " " " abcess	1
" " " " " " " " " " and fac. fist.	1
" " " " " " " " " and hemor.	1
" " " " " doub. uter. and vag. and append	1
" " " " pyelitis and append	1
" " " " Varic. of br. lig. and append.	1
" " " " fib. uter. and append	4
" " " " " " " " and ing. hernia	1
" " " " pelv. perit. (non sup.) lac. pe[illegible] and hernia.	1

DISPLACEMENTS. IV.

Disp. with lac. cer. or peri. or both	58
" " " " and peri.	45
" " " " only	7
" " " peri "	6
Disp. with lac. and cystocele	6
" " " " " and vag. ulc.	1
" " " " " " hemor.	1
" " " " " " append.	3
" " " " fib. ut. append. and diast. recti	1
" " " " pelv. perit. and append.	4
" " " " " " " " and hemor	1
" " " " " " " " float. kid.	1
" " " " append.	7
" " " " " and gall blad. disease	1
" " " " " " incis. hernia	1
" " " " " " giant colon	1
" " " " " " obesity	3
" " " " pyelit	1
" " " " hemor	1

Tuberculosis of the Kidney.

We are now able to recognize this disease at an early stage, i.e., when only the kidney has been affected, through the use of the cystoscope and ureteral catheter. The cystoscope will tell us whether we are dealing with the kidney or bladder disease as the source of the pus.

In many cases, the bladder changes are not specific of tuberculosis, whereas in others they are so characteristic that one can make a diagnosis from the cystoscopic examination alone, without ureteral catheterization. The latter, aided by pyelography to determine the extent of the destructive changes in the ureter and kidney is of great confirmatory value.

In the case of closed tuberculosis pyonephrosis (where no communication exists to the bladder) the diagnosis by our newer methods is of course impossible and must be made by other means. Ordinary radiography is of but little aid in the diagnosis of tuberculosis of the kidney.

I can highly recommend the Forssell method in examining for tubercle bacilli in the urine. The urine is collected for twenty-four hours and then the sediment centrifuged for two or three hours before being stained.—Daniel N. Eisendrath in *The Chicago Medical Recorder.*

HEMORRHAGE ASSOCIATED WITH PARTIAL AND COMPLETE DETACHMENT OF THE NORMALLY IMPLANTED PLACENTA. CASE REPORTS.

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Extensive discussions of this important subject have been published. A short article permits of only a brief and concise summary but may bring home to the practitioner some important facts.

Various names have been applied to this condition but we must not permit the nomenclature to obscure the fact that we are dealing with an affection that has two clinical or symptomatic types, one an absolutely concealed and the other a relatively concealed hemorrhage. It occurs quite frequently as a pathologic condition, is associated with premature and still-birth and occurs as a menace to the mother about one half as often as placenta previa, namely about once in five hundred cases.

So far as the etiology is concerned we may recognize two groups, the mechanical and the toxic. In the former would be included those cases resulting from trauma acting externally and those which are due to faulty mechanism acting within the uterus, short cord, etc. In the latter would be grouped those cases which result from degenerative changes in the placenta or decidua produced by some toxic agent. This process may develop rapidly or more slowly depending on the nature of the toxin and the time of its action.

The symptoms to keep in mind are hemorrhage, shock and pain. There may be no visible bleeding and yet the patient suffer from a very acute anemia. The visible hemorrhage may be fresh or old blood, bloody serum, blood-stained amniotic fluid. The shock may be slight or extreme and is produced by the hemorrhage and acute distension which may result in an incomplete rupture of the uterus. The pain is variable and may be absent, it may be localized or general, there may be only labor pains or there may be intense stretching or bursting pains, due to injury of the uterine wall by the accumulation of blood within it. In the examination of the patient one may find the usual signs of hemorrhage and shock. The examination of the abdomen may show a tonic or atonic uterus. It may be very hard. The distension of the uterus may be uniform or there may be an irregularity due to a circumscribed hemorrhage producing the so-called accessory tumor. The fetal heart sound is usually absent and the fetal parts may be palpated with the greatest difficulty.

Mensuration may show rapidly progressive enlargement of the uterus. Vaginal examination may show the blood or bloody fluid, but one of the main points to determine is whether or not the placenta can be palpated in the lower portion of the uterus.

The differential diagnosis should include chiefly placenta previa, uterine rupture, acute hydramnion, syncope and colic of various kinds. The prognosis is not good. The maternal mortality is from 30-50%, and that of the fetus from 85-95%.

The treatment is all important. Early recognition of the condition is essential. The maintenance of extra- and intrauterine pressure both before and after delivery is of the utmost importance. Early, rapid and complete evacuation of the uterus through the parturient canal is advisable, if conditions favor the method, but if not a Cesarean section should be performed, with or without the removal of the uterus.

Case I. Mrs. A. S. Date, January 22nd, 1908. Age 30. No miscarriages. One premature birth at seven months. Eight full term pregnancies; all labors and puerperia were uneventful. Patient seen at 10:30 A. M. January 22nd. She gave a history of being at term. For a couple of weeks had noticed some blood. Labor pains began at 6:00 P. M. January 21st, 1908. Had more bloody discharge since onset of pains. Fetal movements felt about 8:30 A. M. January 22nd, 1908. Patient complained of constant pain in the abdomen and back with intermittent labor pains. She felt more comfortable. when lying on her back.

Examination showed general condition poor. Anxious expression, pallid. Pulse had risen from 120 at 8:30 A. M. to 134 at 11:30 A. M.; it was irregular, small and rapid. The abdomen was greatly distended, tense and tender. The uterus was very large and firm. The fetal parts could not be palpated and no heart tones could be heard.

Digital examination showed about four cm. dilatation of cervix with partial effacement, membranes unruptured, head movable. No placenta could be felt. There was considerable bloody vaginal discharge.

Treatment— Cervix dilated manually and podalic version done. Still-born male child was delivered. Placenta came away at the same time and was followed by some dark blood clots. There was very little fresh bleeding. Patient was returned to bed in fair condition. About one hour later she became suddenly worse, developed symptoms of pulmonary edema, respiration ceased though heart continued beating for about one half hour.

This case is an instance of the most serious and extreme form of this complication of pregnancy.

Case II. Seen in consultation October 2nd, 1915. Mrs. M. para 1, age 35 yrs. Due about October 20th. Previously well, Seen by Dr. A. about one week before delivery. She had marked albuminuria. The systolic blood pressure ranged as high as 195.

She developed some edema. She felt well until the afternoon of October 1st, when there was some blurring of vision, dizziness and muscular twitchings. She had not improved under rest in bed and appropriate dietary treatment. She was delivered about 9:00 P. M. on October 2nd without special difficulty. The child was well developed but had apparently been dead for several days. The placenta exhibited a very large clot of blood on its maternal side. It had hollowed out the surface, making a concavity. The patient became worse about one half hour after delivery. She complained of faintness, became slightly cyanotic, almost pulseless, though the respirations were fairly good. There was slight inequality of the pupils. She grew progressively worse and died about one hour later.

This case demonstrates the occurrence of placental separation and hemorrhage in association with acute toxemias.

Case III. Mrs. E. S. Age about 35. Para V. Grav. VI. Previous health good. Labors uneventful. Onset of labor about one month before term. She had been doing hard physical work during the preceding week and had felt no fetal movements for three days before delivery. She was delivered spontaneously after a labor lasting about ten hours. When the placenta was delivered about one-fifth of the maternal surface near the margin was much darker and more friable than the remainder—this portion of the surface was covered with an old blood clot.

This case illustrates the effect of a partial separation of the placenta on the fetus without disturbing the mother. It was probably due to traumatism.

Case IV. Miss I. S. Admitted to the hospital in labor October 15th, 1915, at 6 P. M. She was delivered spontaneously of a still-born female at 7:15 P. M. of the same day. She gave a history of a miscarriage five years ago and one labor two years ago. She had some edema of the lower extremities for the past three weeks. Last menstruation May 15th, 1915.

General condition good. There was some edema of the lower extremities. The fetal heart could not be heard. Urinalysis showed the presence of some albumin. The Wassermann reaction was negative.

The placenta was delivered spontaneously and was complete, small, round and showed a dark blood clot on its maternal surface about 5 cm. in diameter. This represents the occurrence of a small concealed hemorrhage without serious effect on the mother but probably the cause of the fetal death.

Case V. Mrs. S. R. Age 38. Last menstruation April 1st, 1915, though date is uncertain. Time of feeling life first is not known. Patient had some headache and vomiting the first three or four months of pregnancy. There has been some swelling of the legs for the past two months. Patient had one miscarriage two years ago. Three previous labors, first 8½ years ago, last 1½ years ago. Puerperia were uneventful. She had some bloody vaginal discharge for a couple of weeks. Began to have labor pains about 1:00 P. M. November 15th, 1915. She was admitted to the hospital in labor at 11:25 P. M., November 15th, 1915.

Examination showed patient in good condition. No fever. Pulse not accelerated. Some edema of lower extremities. Abdomen was rather tense and hard. Uterine bruit was heard. Fetal heart tones were distinct. There was some bloody vaginal discharge. Placenta could not be felt. The pains were weak, irregular and infrequent during the first stage. In the second stage they were more frequent and stronger though irregular.

She was delivered spontaneously on November 17th, 1915, of a male child 37 cm. long and weighing 1510 gms. The placenta and sac were intact around the child. Following the delivery a considerable amount of old dark blood clots were expelled. For several days following delivery there was marked tenderness over the uterus.

There was a trace of albumin in the urine but no casts. Hemoglobin 70%. Wassermann reaction negative.

The placenta showed no old blood clots. It was small, round, complete and partially membranous.

This case illustrates the danger of confusing placenta praevia with detachment of the placenta. It shows that the placenta may be completely detached and yet produce no serious hemorrhage so far as the mother is concerned, but, of course, be fatal to the fetus.

Diagnosis of Urinary Lesions.

The principal reason why so many bladder cases prove annoying to the medical attendant, is to be found in insufficient diagnosis. With a clear diagnosis, direct measures may be instituted and prompt results obtained. Otherwise, we move blindly about our work and our measures are applied in haphazard fashion, to our own discredit and to the patient's disadvantage. The first secret in the differentiation of urinary disorders lies in our ability to make an accurate interpretation of bladder symptoms—or, in other words, not until we become expert cystoscopists do we become proficient in the diagnosis of urinary lesions.—Clarence Martin in the *N. Y. Medical Journal.*

Goiter Surgery.

The fact that our results in goiter surgery have been steadily improving during the past few years is due to two factors: first, and most important, a better knowledge of the clinical course of toxic goiters, and of when to select a favorable time for operative interference; and, second, to improvement in technic. There is little doubt that many of the bad results which have followed goiter surgery in the past arose largely from a want of knowledge in the proper selection of cases.—Everett O. Jones, in *Northwest Medicine.*

OPERATIVE VS. NON-OPERATIVE TREATMENT OF FRACTURES.

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The present keen and widespread interest in the treatment of fractures of the long bones, as evidenced by papers appearing in medical journals and discussions before medical societies, arises from the fact that in a considerable number of cases the anatomic and functional results obtained from manipulation, fixation and extension have been found more or less satisfactory.

The brilliant pioneer experimental and clinical work of Lane, Lexer, Murphy and others has shown the possibilities of aseptic surgery when applied to injuries of the bones and joints, and osteosynthesis may be said to have acquired a new and live interest. Moreover, the present would seem an opportune time for revision of our views regarding the treatment of this important class of injuries. We have learned much from the application of radiography, and considerable evidence is now available regarding the advantages and disadvantages of the so-called open method of treatment in simple fractures of the long bones.

The open method of treatment is attractive. The results are satisfactory to both the surgeon and the patient. The first and greatest advantage is the power thus gained of accurately replacing the fragments and of insuring their retention in position. The second advantage is the ability to perform early and frequent massage of the muscles and mobilization of the joints, thus anticipating and preventing the muscular atrophy and joint stiffness which might markedly prolong the period of disability.

One clearly established point is that "a good anatomic result is the best guarantee of a good functional result." This is a timely statement. There has recently been a tendency to excuse failure in obtaining a good anatomic result by claiming a good functional result, while admitting that the fragments were not quite correctly replaced; and this doctrine has been used as a shield for the indifferent reduction of broken bones. To a certain extent it is true that a good functional result may be associated with a moderate or bad anatomic result. Much may be accomplished under Wolff's law that "all tissue changes in bone are determined by function alone, i. e., that the normal shape of bone as well as that assumed under pathological conditions is made secondary to the function of the bone. Increase of pressure results in accretion of bony material, and the amount of bone added is proportional to the increase of the burden at any point of the bone." Nevertheless, the ultimate result with imperfectly replaced fragments is usually far from satisfactory.

The pertinent question which naturally arises is: "Can we obtain better anatomic results by the open treatment of fractures than by other methods?" To this question one might reply: "In some cases, yes; in others, no." It would follow, then, that all fractures in which good replacement of the fragments cannot be secured and maintained by manipulation and extension, should be treated by the open method; provided it can be safely used without increasing the period of disability.

Just here arises one of the most important issues in the whole question: It must be conceded that surgical technique sometimes fails, and in considering the open treatment of simple fractures we must recognize that in addition to other possible complications incident to any operation under general anesthesia, there is the danger of infection even when the operation is performed by a hospital surgeon under the most favorable surroundings. The aseptic precautions which appear to answer admirably in abdominal work are inadequate in surgery of the bones and joints. Are we then justified in advising the open treatment and plating of simple fractures? Believing that these accidents are preventable and may be avoided by those properly trained, I would answer "yes, in all instances where in no other way can a satisfactory functional result be obtained; provided the patient is a suitable subject for major operation."

Radiography should be used in all cases to demonstrate the existence of the fracture, the number, position and shape of the fragments and their relation to each other. In some instances it will be immediately apparent that a satisfactory anatomic result by manipulation and extension will be absolutely out of the question; in others there may be revealed evidence of such extensive injury to important vessels or nerve trunks as to demand further examination through an incision; in other cases the radiograph may show merely a transverse fracture giving promise of easy reduction and retention in position. Between these extremes there is a large number of cases (and this group probably includes the majority of all cases) where surgical opinion may differ as to the most suitable method of treatment. In Bardenheuer's clinic they would all (or nearly all) be treated by manipulation and extension, and those of us who have visited Cologne have seen wonderfully good results obtained in that way. Lane might advise the open operation in all (or nearly all) of them, and many of us can from personal observation testify to the beautiful anatomic results obtained in his clinic at Guy's Hospital.

Personally, I think that as soon as the shape, position and number of the fragments have been determined, an attempt should be made to reduce the fracture and maintain it in position by manipulation, fixation and extension practiced, when possible, under anesthesia; and as soon as convenient additional radiographs should be obtained to display our success or failure. If a good anatomic result has been obtained, then a good functional result may be confidently expected. If anatomic replacement of the fragments has been imperfect, then a good functional result certainly cannot be promised, and there being no contra-indication, treatment by the open operation should be recommended.

I cannot say that I have observed much improvement in the position of the fragments after they have presumably been reduced and extension applied. The full length may be restored and correct alignment secured, and yet the radiograph may show lateral deviation of the fragments; or the upper fragment in a high fracture may be displaced anteriorly, and abducted; or the lower fragment displaced backward.

That it is always desirable to secure perfect replacement of the fragments in a broken bone will probably be conceded by most surgeons; but is it always necessary to immobilize them absolutely with a plate and screws? In the case of fracture of the femur, as a rule a plate is required to prevent change in position of the fragments while the external splints are being applied.

All the fragments should be saved; it is unnecessary that they should have attachment to the soft tissues; they may be completely detached, denuded of all periosteum, temporarily removed and placed in warm saline solution for half an hour or more, and then be replaced. Large and important fragments (six to eight inches long) thus replaced and held in position by Lane plates have united perfectly as shown by repeated radiograms and good functional results. The main essential is asepsis, and, as emphasized by Murphy, raw surface must be placed in contact with raw surface so that the vessels may readily pass from the Haversian canals of the parent bone to those of the autogenous graft. In one case the end of a long and important fragment extended into the knee joint, yet no troublesome callus resulted, and after union flexion and extension were but little less than normal.

I think the question of absolute immobilization of the fragments by a Lane plate after replacement is open to discussion. The important point is correct replacement with retention in position, rather than immobilization; although in fractures of the femur Lane's plates will generally be found more advantageous than other modes of fixation.

In a general way it may be said that when the fragments of a broken bone have been accurately placed in position, there is less tendency to future displacement than has hitherto been believed. In one instance where fracture of both bones of the forearm had occurred, two experienced men failed to replace the fragments under anesthesia. When placed in correct position through an incision, there was no tendency whatsoever to further displacement. In one case of non-union of the shaft of the radius, and in two fractures of the shaft of the humerus, satisfactory results were obtained by inserting a "dowel" taken from the crest of the patient's tibia into the medullary canal of the upper and lower fragments.

The cause of delayed union is sometimes difficult to explain. It may occur following fractures in healthy young adults, where the fragments are in good position. Passive hyperemia and passive motion will oftentimes stimulate repair. In other cases success follows more complete immobilization of the fracture site together with the proximal and distal joints. Passive motion in these cases sometimes acts like a whip applied to a tired horse, "it wakes him up to increased effort." In other cases more perfect immobilization "gets him to his journey's end by giving him time and allowing him to go slowly."

Does union occur more slowly when Lane plates are applied? This is a difficult question to answer. Darrach, Ashhurst, Freeman, Martin, Albee, Murphy, Roberts and Brickner, have expressed the opinion that it does. Many other surgeons, however, hold the opposite opinion. In none of my cases has there been any evidence that plating delayed union. I am certain that plating shortens the period of disability by offering an earlier opportunity to massage the muscles and mobilize the joints.

In conclusion: I wish to express preference for a delay of five or six days before resorting to the open operation. This period allows the soft tissues to partially recover from the associated trauma, and circulation in the blood and lymph vessels to be partially restored, probably largely by the development of collaterals.

BACTERIN THERAPY IN SEMINAL VESICULITIS OF HEMATOGENOUS ORIGIN. A CASE REPORT.

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and
L. B. Mount, M.D.,
Albany, N. Y.

Within a comparatively recent period our attention has been called to the fact that it is not of rare occurrence for the seminal vesicle to harbor microorganisms of hematogenous origin for rather long periods of time.[1]

Neisserian infection of the uretha not infrequently produces a seminal vesiculitis, while tuberculosis of the epididymis may, and often does, extend to prostate and seminal vesicle.

On the other hand, acute infections of hematogenous origin involving primarily prostate and vesicle, non-gonorrheal in nature, are of less frequent occurrence.

In reference to the latter type of lesion, the following case is of interest:

A. R., aged 21, student, born in U. S., complaining of bladder irritability and frequent micturition. Family history negative. Patient suffered from the usual diseases of childhood. Typhoid fever at the age of 14; rather mild attack with good recovery. For the past four or five years has suffered from hemorrhoids which produce constipation and bleeding at intervals. Beyond this he has been in good health and has not required the services of a physician. There is no history of throat infection, dental caries or venereal disease.

About eight weeks prior to our having seen him the patient reports that he noticed a rash on the abdomen composed of small reddish macules that became confluent, and slowly spread to chest and neck. The latter was unaccompanied by any feeling of malaise nor did it cause any particular local discomfort. A dose of calomel and salts with free purgation seemed to dissipate the rash and the patient thought nothing more of it. Forty-eight hours prior to the onset of the present attack he began to complain of frontal headache, vague joint and muscle pains and general malaise. He also suffered from sensations of chilliness although no definite rigors were present. These symptoms persisted with increasing severity until the early morning of the day upon which the patient was first seen by one of us.

At about 5 A.M. of this day the patient was awakened from sleep with an urgent desire to urinate; and with pain over the bladder area. During the act of micturition he suffered intense pain that became more marked just at the close of urination, the pain radiating from the bladder area down along the head of the penis. The urine was cloudy and a small clot of blood that had been voided attracted the attention of the young man.

From this time on the patient had been forced to void as frequently as each half hour during the day; and the symptoms mentioned above, namely, pain, cloudy blood-stained urine and bladder irritability have persisted.

There is no history of spermatorrhea nor of an erection occurring during this period. There has been one severe paroxysm of pain in the region of the rectum extending downward along the groin.

The history is otherwise negative.

Physical examination. A young adult rather poorly developed and nourished. Temperature 99, pulse 80. Upon rectal examination the right lobe of the prostate is found decidedly hypertrophied, hard and tense to the touch with a smooth even contour. The right seminal vesicle is definitely palpable and decidedly engorged, the latter, in contrast to the prostatic lobe, being somewhat nodular and not so firm in consistence. It gives the impression of being filled with contents of a semi-fluid character and is firmly attached to the prostatic capsule. There is some enlargement of the median prostatic bar, and the left lobe is also slightly hypertrophied although not to a marked degree. The right vesicular-prostatic area is markedly sensitive to the slightest pressure of the finger tip. The examination reveals at once an acute seminal vesiculitis associated with prostatitis on the same side.

Abdominal examination reveals no thickening of either ureter and there is no tenderness in either of the kidney areas or along the course of the ureters. Pressure over the vesical area causes slight pain. The external genitals are normal and there is no evidence of hernial protrusion.

Sterile catheterization shows the urine filled with pus cells, microorganisms, and blood both macro- and microscopically. There is an intense reaction to the guaiac test. Alkalinity and albuminuria are both marked. Numerous spermatozoa are observed under the microscope. A portion of sterile urine injected into a guinea pig causes death of the latter within thirty-six hours from septicemia. Tubercle bacilli are not obtained from the sediment but cultures made from the catheterized specimen obtained under aseptic precautions yield colon bacilli in large quantities.

A diagnosis of vesiculitis of hematogenous origin with secondary cystitis and prostatitis was made and the patient placed upon hexamethylenamine. Injections of a stock colon bacterin were begun. The patient began to respond almost immediately to the bacterin therapy, the urine clearing of pus and blood. Pain and vesical irritability diminished with remarkable rapidity.

Five bacterin injections were given, the initial dose being 17,000,000, and the dosage being gradually raised so that the fifth and final injection consisted of 62,000,000 killed bacteria.

The patient made apparently a complete and uneventful recovery. Three weeks following the initial attack he was again seen by one of us, at which time our notes on the case report the patient as "feeling fine." He was now voiding without discomfort every three hours. Examination revealed an apparently normal seminal vesicle, although the right prostatic lobe was still slightly enlarged and somewhat sensitive but markedly decreased in size as compared with the initial examination. The urine had changed from alkalinity to slight acidity. Beyond a few epithial cells and amorphous urates it was negative microscopically—no spermatozoa or blood. A second catheterization was performed and the sterile urine injected into a guinea-pig for possible development of tuberculosis, but results along this line were negative.

At the present time the patient is in good health and there has never been a recurrence of his former symptoms.

A fairly careful perusal of the literature of the question of vesiculitis from the standpoint of bacterin therapy does not reveal an abundance of material from which to draw conclusive evidence.

It has been said by one authority that "accurate vaccine therapy is a most valuable aid in the treatment of pus tubes in the male."[2]

Case reports from other sources likewise are favorable as to the efficacy of bacterin therapy in this condition.

"Greatly improved and possibly fully cured" is the conservative but hopeful statement of a report embodying the results of autogenous bacterin prepared from cultures containing mixed growths of Gram—positive diplococci resembling the gonococcus.[3]

Three case reports of gonorrheal vesiculitis treated by means of autogenous vaccines with good results are likewise reported in the literature of 1910.[4]

While we realize that a single case report is of no great scientific value yet the rather unusual clinical features of this case and the somewhat rapid and startling response to bacterin therapy have prompted the present communication.

The experience of other surgeons in this field coupled with our own rather meager observations, which we hope to supplement at some future period, lead us, however, to draw the following conclusions:

(1.) The seminal vesicle is capable of harboring micro-organisms for relatively long periods of time.

(2.) The hematogenous origin of a lesion of the seminal vesicle should not be overlooked.

(3.) Seminal vesiculitis is undoubtedly of more frequent occurrence than is commonly supposed.

(4.) Bacterin therapy is a decided aid in the treatment of the condition, and is worthy of trial in all cases.

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RUPTURE OF AN OVARIAN CYST DURING EXAMINATION.

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Cleveland, Ohio.

A very unusual and interesting experience, but one which is very unpleasant and causes much apprehension to the physician is the rupture of an organ during an examination.

Mrs. W., nullipara, aet. 20, married 18 months. Her previous menstrual history was negative. For six weeks prior to my examination she had suffered from severe pains in the lower abdomen, especially to the right, and profuse and almost continuous uterine hemorrhage mixed with blood clots and mucus. She also complained of weakness, constipation, marked anemia and anorexia.

Examination showed a marked anemia from the loss of blood, tenderness and rigidity at McBurney's point. The uterus was slightly enlarged with the fundus forward, but pushed up and to the left by a cystic tumor the size of a lemon, in the right cul-de-sac. There was a considerable discharge of blood and mucus from the cervix. While gently outlining the mass and without causing any pain, the tumor suddenly collapsed and the escaping fluid gave a purring sensation to the fingers. Although I urged the patient to go to a hospital immediately, she walked home, a distance of half a mile.

During the next twelve days she suffered no ill-effects from the accident but consented to enter a hospital on account of the continuous bleeding. Her temperature and pulse were 99° and 110° respectively and the anemia was more marked

Under ether anesthesia considerable mucous membrane, blood, and mucus were removed from the uterus. A right rectus incision was then made and a thickened, congested appendix containing a fecal concretion was removed.

The right tube was enlarged and inflamed but the ostium was patulous. In the right cul-de-sac there was an enlarged, collapsed ovary lying in a mass of blood clots. On the surface of the ovary was a ragged hole about half an inch in diameter leading into a large irregular hemorrhage cavity of the ovary. The right tube and ovary were removed The left tube and ovary appeared normal. The uterine hemorrhage stopped the next day The patient made an uneventful recovery and left the hospital within ten days. Fifteen months later she gave birth to a healthy child

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WALTER M. BRICKNER, M.D., Editor

New York, May, 1916.

RETROPHARYNGEAL ABSCESS IN INFANTS.

Relatively common in infants and small children is retropharyngeal suppuration—an infection that must always be regarded as serious, not only because of its interference with feeding and, often, with respiration and because of its toll, as a septic process, upon nutrition, but also because, if too long unrecognized or if clumsily handled, it is sometimes fatal. We are referring to the acute retropharyngeal abscess and not to that rarer and even more serious chronic variety that arises from cervical spondylitis.

Why the affection should be so much more common in infants than in older people has not been satisfactorily explained, as far as we know; nor, indeed, is its pathology entirely clear. That it may develop after tonsillitis or pharyngitis is well known, but such abscesses occur even when no antecedent throat affection has been noted. It seems entirely reasonable to continue to believe, however, that the process develops as an infection from the pharynx, naso-pharynx or the ear and that this infection travels through the lymphatics to the retropharyngeal nodes and the tissues surrounding them.

The classical symptoms—dysphagia, regurgitation, dyspnea, altered voice, rigidity of the neck, prostration and fever and, often, visible swelling at the side of the neck, point the way to the diagnosis. But it must be remembered that all the conspicuous signs may be absent in cases in which the abscess is still relatively small; and therefore worth bearing in mind is the importance of a *digital* exploration of the pharynx in all infants and small children suffering with prostration and fever not otherwise accounted for. We say *digital* exploration, for mere inspection may quite fail to reveal the condition, either because it does not bulge sufficiently or because the abscess lies too far down to be seen. In these small throats, even palpation may, at first, not recognize the swelling. Unless large, it is often fairly flat and hard. Only a well developed retropharyngeal abscess feels distinctly fluctuant; more commonly it is merely "elastic." While often situated in the midline the abscess is frequently lateral.

Many surgeons advise that all retropharyngeal abscesses should be opened through the neck. This is, indeed, the more elegant procedure, and it has the important advantage that it quite obviates the danger of pus entering the lungs and the stomach. This is a very important consideration (see editorial, Lung Abscesses Following Tonsillectomy, March issue of The Journal, page 95). The approach through the neck has, however, the disadvantages that it involves dissection through often healthy tissues, that it leaves a scar, that it requires the services of one surgically facile and familiar with the local anatomy, and, especially, that, although it can be performed under local anesthesia, it usually involves the administration of a general narcotic, which carries a possibility of great danger in these often debilitated children whose respiration is usually already impeded. When there is a fluctuating swelling in the neck drainage through that route is indicated; but the caution must be observed that the primary abscess is thus drained and not merely an associated glandular abscess.

The advantages of opening the abscess through the pharynx are that this can be done immediately that the diagnosis is made, and by any careful practitioner, and that, being but the work of an instant, no anesthetic is required. In order to provide free exit of the pus through the mouth, many advise that the child should be held in the sitting posture with the head thrust forward. It seems to us that, to avoid the inspiration or swallowing of pus, it is better to have the child on its back with the head dependent over the edge of a table and turned to the side. The abscess may, of course, be opened with a bistoury or "guarded" scalpel, but, unless the parts are exposed, the knife may injure other tissues; moreover, the opening made by a scalpel may close prematurely. Better is the employment of a grooved director, and better still, it seems to us, narrow bladed scissors, dressing- or artery-forceps. With only the finger as a guide (mouth gag and tongue depressor are unnecessary) the closed scissors or forceps are plunged into the center of the abscess, the blades quickly opened and finger and instrument at once withdrawn. Instantly the child is turned on its face, with the head still dependent, and the pus is promptly evacuated.

The procedure requires celerity. The finger and instrument should be but a moment in the small throat, already partly occluded, lest they cause a suffocation which, though transitory and therefore in itself usually not fatal, may produce a commotion on the part of the operator and a struggling on the part of the infant that will result in the inspiration of some, instead of the expulsion of all, of the pus. If this precaution is observed, and if the child is immediately turned face downward and with the head dependent, the pus will escape through the mouth with relatively little danger to the lungs. He would be bold, indeed, however, who asserted that this operation is free from all danger of aspiration into the lower air passages. To minimize this danger it is desirable to hold in the threat during the operation and until it is quite cleared of pus and vomitus a suction tip, as a catheter or rubber tubing, attached to a vacuum apparatus (see editorial above referred to) or to a two-way aspirating syringe or other extemporized device. After the abscess has been safely evacuated, the danger of lung infection is probably remote, for, though pus subsequently escaping into the pharynx is no doubt swallowed by these infants, it does not seem likely that it will find its way into the larynx.—W. M. B.

PROSTATIC CALCULI.

The occurrence of prostatic stones is sufficiently uncommon in the experience of most surgeons to provide much interest in their symptomatology, diagnosis and treatment, the more so since most of the text-books, even those devoted to genito-urinary diseases, give little space to the subject.

The books divide prostatic calculi into two varieties: 1. Those which originate in the prostatic urethra or, more often, passing down from bladder or kidney, find lodgment there. (The latter are not prostatic calculi and should not be so designated.) 2. Those which originate in the gland and may or may not project into the urethra. Thomson Walker describes three varieties: 1. Those originating in bladder or kidney and lodging in the prostatic urethra. 2. Those originating in pouches communicating with the prostatic urethra. (These are apt to project into the urethra.) 3. Those developing in the substance of the gland.

The glandular calculi are generally described as arising from the deposit upon the corpora amylacea of phosphates and of calcium carbonate. While we know that lime formation occurs in dead tissues, and that it is frequently deposited, independent of infection, beneath the subacromial bursa in and about the spinatus tendons, nothing, as far as we know, has been adduced to demonstrate that prostatic calculi may form without an antecedent infection. Irrespective of this consideration it will provide a clearer conception of the pathology of the condition to regard it not merely as one of prostatic calculi but rather as a calculous prostatitis, for, at least in all cases that produce symptoms, the stones provoke an inflammation of the gland even if they have not had their origin in such an inflammation.

The symptomatology of prostatic stones is interesting in its variability and the diagnosis, correspondingly interesting, is usually to be made by a nice balancing of subjective and objective phenomena. The stones may be present for a long time, even indefinitely, without any symptoms and thus found only at autopsy. They may be passed per urethram without previous or subsequent symptoms. They may provoke only perineal pain or discomfort or pain on defecation. They may cause severe pain radiating to the testicles or the thigh or the rectum. They may cause only sticking pain at the end of the penis during or immediately after urination, especially if a calculus projects into the urethra. They may cause hematuria, in distinct attacks or only in small amounts at the end of micturition. They may cause purulent urethral discharge. They may produce all the symptoms of cystitis.

The books tell us that the diagnosis may be made if, on rectal palpation, one feels the stone when it is large enough (but surely it would be difficult to distinguish it thus from a firm adenoma, from tuberculous nodules or from the thickening of a chronic prostatitis), or feels the crepitation of multiple stones, or by the grating against a bladder sound detects a stone projecting into the urinary channel. It might be added that in calculous prostatis the organ is *very* tender to the touch, but this is scarcely diagnostic since the prostate is always quite sensitive when inflamed from any cause and individuals vary in their response to pain.

The books also tell us that prostatic stones cast an *x*-ray shadow, but they do not tell us how to distinguish this from the shadow of a vesical calculus. Prostatic calculi are usually quite small and multiple If many small, discrete shadows appear within an area that might be bounded by the prostatic capsule, the radiographist will, or should, at once think of their origin within that body. But usually these shadows are not sharp and discrete; they are apt to be conglomerate and to give an image that at once suggests a large round or irregular bladder stone and is thus interpreted by the roentgenographist. He may, however, easily make a differential diagnosis by a method that we have elsewhere suggested. If a radiograph of the *unemptied* bladder, exposed with the patient in the level supine or reversed Trendelenburg position, shows a shadow or group of shadows in the region of the neck of the bladder, and a second radiograph, exposed with the patient in the Trendelenburg position and the *x*-rays passing in the same relative direction, shows the shadow in the same place as before, the stone or stones are fixed in the prostate or the prostatic urethra or in a diverticulum behind the prostate.

There is another diagnostic consideration, not referred to in the books, which also we think worth calling attention to again, namely, that, in a case of purulent prostatitis, the absence, for a long period of time preceding, of all signs of local infection is strongly suggestive of a calculous etiology.

If a stone lies in, or projects into the urethra it will, of course, be attacked by a perineal incision, and for calculi within the gland the perineal route will also be preferable. If the stones are numerous and scattered throughout the gland prostatectomy, more or less complete, may be necessary, a procedure by no means as easy as the enucleation of an adenomatous organ; for its accomplishment the surgeon may elect either the suprapubic or the perineal route, the latter probably offering advantages in such cases unless the organ is large or projects into the bladder. If a prostatic stone mushrooms into the bladder the suprapubic route would seem to be indicated.—W. M. B.

THE WIDER USES OF HYSTEROTOMY.

"In surgical diseases it has been proved by modern surgical methods that the best way to attack a pathological condition or unfold a puzzling symptom-complex is to expose the afflicted parts to the light of day and to the eye of the surgeon." With this characteristic statement of an important fact in medicine, John B. Deaver, eminent exponent of the practical and the direct in surgery, again pleads for a much wider application of the operation of hysterotomy, not only in obstetrics but also as a diagnostic and therapeutic resource in maladies of the now-pregnant uterus. (*Surgery, Gynecology and Obstetrics,* April, 1916.)

One must agree with Deaver that in many obscure cases of uterine disease, and notably those associated with bleeding, the "blind methods of diagnosis" now in vogue—consisting chiefly of palpation and diagnostic curettage—very often leave much, indeed, to be desired; and that free section of the uterus, exposing its wall and its interior to direct inspection and palpation, affords much greater assurance of accurate diagnosis. If theoretical consideration alone leaves any doubt concerning the safety or the value of the procedure, it is resolved by Deaver's statements that he has been performing this operation for years with no mortality and that by it he has revealed and relieved certain obscure conditions which otherwise would have escaped early diagnosis. Among these conditions he mentions malignant changes in the fundus uteri. Deaver recommends two general indications for hysterotomy: 1. As the operation of choice for emptying the pregnant uterus in placenta previa, premature separation of the placenta, eclampsia, prolapse of the cord if the cervix is rigid and the child is still living, and certain cases of pyelitis. 2. To establish a diagnosis in obscure cases, notably those of bleeding in middle-aged women and if malignancy is suspected.

That curettage, employed for diagnosis, will often provide the means of a histologic diagnosis of carcinoma and thus establish the indication for hysterectomy of the unopened uterus is familiar experience; and its value is far too well established to dispute it—whatever may be said against its indiscriminate employment. But when examination of the tissues removed with the curette fails to supply a definite and satisfactory explanation of continued symptoms then exploratory hysterotomy seems a wise and justified operation.

Deaver prefers transperitoneal abdominal hysterotomy to either the suprapubic, extraperitoneal or the vaginal route. As concerns the suprapubic path probably most surgeons will agree with him. For free exposure of the uterine cavity and inspection and palpation of its wall the abdominal route will, again, appear superior to many, although the uterus may be brought down and split to its fundus through the vagina. For emptying a pregnant uterus gynecologists and obstetricians will probably continue to select either the vaginal or the abdominal route according to the duration of the gravidity, the condition of the patient and their individual preferences. Our purpose here is to call attention to the wider indications for hysterotomy, as maintained by Deaver, rather than to discuss the methods of performing it.—W. M. B.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

Street Accidents.

"Safety First," as a slogan, has become popular with many lay organizations and is now seen almost daily in the columns of the press and magazines. The motive of "Safety First" organizations consists of a desire to advise practical measures for the prevention of accidents. While industrial injuries have attracted particular attention, the phases of service involving the reduction of the ordinary hazards of living under urban conditions are not relegated to the background.

The complex state of traffic in large cities is particularly responsible for an unusual proportion of injuries and fatalities. W. P. Beazell, of the *New York World*, during the latter part of 1915, made a survey of the traffic conditions in New York City. As a result of his inquiry, some serious facts developed. The street problems of New York City vary only in degree from those to be found throughout the United States.

Every 22 minutes some one is injured in a street accident in New York City. During the first 11 months of 1915, there were over eighteen thousand accidents and 21,723 persons were injured. The total number of fatalities for this period of time was 612. Two of every five killed were children under 16 years of age.

While homicides are given columns of space in the newspapers principally because of the spetacular features surrounding them, it is only rarely that the injury of some important personage or the attempted rioting of an enraged neighborhood calls for extensive public notice to street accidents. There are however, two and a half times the number of deaths in street accidents than are occasioned by homicide. What is more suggestive, however, is the regrettable fact that the number of these deaths in New York is greater in proportion to population than is the case in any other great city of America or Europe.

Five years ago street fatalities in New York City were at the rate of 7.98 per hundred thousand population, while in 1915 this rate mounted to 11.65 per hundred thousand population. In other words, the street fatalities have grown 46 per cent. during 5 years.

The tremendous increase in vehicular traffic apparently is responsible in large measure for the development of this injury rate. Thirty-six per cent. of all deaths and injuries in vehicular accidents are the results of automobiles. In responsibility, the passenger automobiles are the most involved, while automobile trucks, despite their power and speed, are responsible for only one per cent. of the killed and four per cent. of the injured.

In the general mind of the public, the vehicle is usually held responsible, but this popular opinion does not take cognizance of the contributory factors inherent in the carelessness or indifference of pedestrians. For example, 1 of every 7 street accidents occurs to a person who is in a street at some other place than at a crosswalk. Children, particularly, are the victims of street accidents while playing, skating or coasting in their most popular playground—the public thoroughfares.

Street accidents reach their highest level coincidentally with the peak of pedestrian travel between 5 and 6 in the afternoon. Possibly physical and mental fatigue, incident to the day's occupation, decrease the alertness of the pedestrian and thus makes him less attentive to his own safety.

While power-driven vehicles are pre-eminently responsible for the injuries, it cannot be gainsaid that the lack of playground facilities for children, which is a municipal responsibility, is a most important and a pathetic contributory factor. More than half of the lives sacrificed in automobile accidents have been those of children under 16 years of age, while the ages of 3 to 8 years inclusive apparently are those of greatest danger to children.

Under these circumstances, it is patent that the solution of the problem of accidents growing out of traffic is complicated. Various administrative regulations should be made with a view to controlling traffic, particularly in crowded thoroughfares. More precautions are essential in restricting the speed of vehicles in localities where children are most numerous, especially during the hours when the adult population adds to the sidewalk congestion. The establishment of play streets, backyard and roof playgrounds and the extension of the park system immediately suggest themselves as "Safety First" devices for decreasing street accidents among children.

In addition, it is obvious that a wholesale educational campaign is necessary to point out the dangers of the streets, to encourage street crossing only at crosswalks, and to point out the inherent hazards of playing in the streets.

Departments of Education have made some attempts to give educational force to the "Safety First" campaign. In so far as education is designed to make good citizens, there is a valuable service which it can perform in giving adequate instruction to children as to the best methods of preserving life and limb. In many schools, it is already the custom to delegate to the older pupils the specific duty of seeing that groups of the younger children are safeguarded while crossing busy streets adjacent to the schools. These efforts supplement the excellent work now performed by traffic policemen in holding up traffic at crosswalks in front of schools during the hours that children are going to or leaving the school houses. The 7,126 children under 16 years of age who were injured during the 11 months supply sufficient reason for giving particular attention to this phase of the problem

The faults of drivers may be summed up as speeding, driving on the wrong side of the street, turning corners improperly, backing without notice, violating the 8 foot law, travelling without lights, intoxication and carelessness. Summary punishments for accidents due to these causes might serve to mitigate their frequency. Defects of vehicles themselves may be responsible for many of the accidents, but they represent a negligible proportion of the total.

The faults or incapacities of the injured persons indicate the general subjects concerning which education must be given. These involve stealing rides, improperly boarding or alighting, running in front of vehicles, walking, standing or sitting in the streets and on the curbs, crossing streets at points other than crossings, general playing in the street, riding or coasting on the wrong side of the street or in dangerous parts of the street, and personal defects such as blindness, deafness or a crippled condition. Carelessness naturally forms an important item.

Inasmuch as the study of traffic conditions reveals the fact that the accidents growing therefrom are largely preventable, it is unfortunate that widespread efforts have not been made to decrease their number and severity.

Book Reviews

Cancer of the Stomach. A Clinical Study of 921 Operatively and Pathologically Demonstrated Cases. By Frank Smithies, M.D., Gastro-enterologist to Augustana Hospital, Chicago. With a chapter on the Surgical Treatment of Gastric Cancer, by Albert J. Ochsner, M.D., Professor of Clinical Surgery in the University of Illinois. Octavo; 522 pages; 106 illustrations. Philadelphia and London: W. B. Saunders Company, 1916. Cloth, $5.50, net; half morocco, $7.00, net.

This work is of monumental character, based upon a most careful and critical review of 921 cases of carcinoma of the stomach, cases collected by Smithies during a wide and varied experience of ten years as a member of the staffs of the University Hospital (Ann Arbor, Michigan), the Mayo Clinic, the Augustana Hospital (Chicago), and the University of Illinois. Only a very close and careful reading of this most valuable volume will give the reader an appreciation of the full worth of the contained facts; no detail has escaped the authors' closest scrutiny, no possible point on which the inquirer will fail to obtain exact figures as to incidence of occurrence, value of a laboratory test, method of procedure, etc. The monograph, in its completeness, rivals even its exactness.

The book has been written from the viewpoint of one who accepts the conclusions of McCarthy and Wilson in regard to the frequent degeneration of chronic ulcers of the stomach into carcinomata. As is generally well known, these authors have formulated the theory that a large proportion of gastric cancers develop on an ulcer basis, substantiating their contention by most exact histologic study of excised chronic ulcers and tumors. In their experience, 71 per cent. of undoubted gastric carcinomata presented clinical or microscopic evidence of previous ulcers. In their view cancer is malignant hyperplasia.

Needless to say, their contention is not accepted generally without exceptions, for the question debated is always, "What is malignant hyperplasia and what is benign hyperplasia?" Where does the simple adenomatous hyperplasia which accompanies every chronic and healing ulcer become a malignant process? Those who do not categorically accept the view of McCarthy and Wilson and of Smithies will feel, in reading this volume, that in this series of 921 cases there are some that in their own laboratories they would call very questionable, or even simple benign callous ulcers.

All of the figures and percentages quoted in this work are necessarily colored by this viewpoint, since the largest proportion of the cases in this series are not, as was the older view, cases that without previous gastric history complained of failing appetite and weight, vomiting, hematemesis and a growing mass, but are cases of chronic callous ulcer of the stomach, which upon excision and examination showed areas of beginning or advanced malignant hyperplasia. In fact McCarthy and Wilson claim that two-thirds of excised callous ulcers show malignant metamorphosis.

Keeping this newer viewpoint in mind, it will be of interest to review a few of the more prominent facts in the text.

Carcinoma of the stomach is divided into the following symptom-complex headings:

Group 1—Gastric cancer in patients who came to laporotomy for clinically benign gastric ulcer and in whom cancer was microscopically diagnosed. This group comprises 7.8 per cent. of the cases.

Group 2—Gastric cancer, developing clinically in patients with years of antecedent dyspepsia of the peptic ulcer type. This group comprises 47.3 per cent. of the cases. Of these 89 per cent. show vomiting, 74 per cent. of daily occurrence.

Group 3—Gastric cancer in individuals who prior to the onset of a malignant disease had enjoyed good health. In the words of the author, "This group satisfies the popular conception of what constitutes gastric cancer clinically."

Thirty-one per cent. of 921 cases belong in this class. Occult hemorrhage is present in 86 per cent. of these cases. Rise of temperature was not unusual.

Group 4—Gastric cancer in individuals in whom malignancy followed periods of gastric disturbances of irregular clinical type (9.12 per cent. of the cases).

Group 5—Gastric cancer in individuals who presented few clinical evidences of a malignant process primary in the stomach wall (2.1 per cent.)

Group 6—Gastric cancer secondary to extragastric malignant process (1.7 per cent.).

Thus we note that groups 1 and 2 comprising the cases of cancer on an ulcer basis make up 55.1 per cent. of all the cases.

Smithies lays particular emphasis on thorough preparation of the patient before examination. He credits this careful preliminary lavage, catharsis and enemata with many of the so-called clever diagnoses possible. A hot bath of 15 to 30 minutes' duration at a temperature of 37½° C. is strongly recommended as an adjuvant to examination.

With the assistance of these measures, a tumor or abdominal mass was palpable in 66.7 per cent. of the cases. Changes of position in the patient and inflation of the stomach and the colon assist both in bringing out tumors and in localizing the organ to which they belong. In 16 per cent. of the cases pelvic metastases were palpable by rectum, forming the so-called "Bloomer's shelf."

The author lays great stress on the importance of obtaining accurate chemical data in all cases suspected of new growth. More important still is the proper interpretation of such data when obtained. He decries the recent tendency to belittle chemical means of establishing a diagnosis, a tendency which is only too rife in these days. The chapter on test meals, examination of fasting stomach contents, motor meals, etc., is admirably handled, the methods discussed in detail and their interpretation amply considered. As an example, Smithies found lactic acid present in 66.1 per cent. of his cases; in 95 per cent. of the cases in which lactic acid was found the tumor was already inoperable. A new method of agar-agar fixation of gastric residues is well described and deserves further consideration. In 221 consecutive cases Boas-Oppler bacilli were demonstrated in 93.6 per cent. Most interesting studies on the cultural and morphological characteristics of the bacilli are given in much detail, many of the methods used being quite original. The Gluzinski test, Edestin test, glycyltryptophan and tryptophan tests, formol index, and Wolff-Junghans test receive much attention from the author; he not only refers liberally to the literature, but gives his own unbiased opinion and experience with them.

The chapter on Roentgen examinations is thoroughly considered, though it is soon evident that the author does not rely extensively on this method of procedure for an early diagnosis. He believes that in most of the cases the clinical history and the stomach tube will establish the cause of the symptoms more cheaply and sooner than the *x*-ray He values this latter instrument more for its ability to localize tumors and for the psychic effect on the patient Admirable photographs of radiographic plates of tumors of the stomach are liberally supplied.

Under the chapter of blood examinations in gastric tumors, the author describes some of the less well recognized and less familiar tests of the disease. The hemolytic reaction, the cancer skin test, the cancer reaction of Freund and Kaminer, the antitrypsin reaction, Abderhalden, myostygmin reaction, etc, are all considered, though the author draws his own conclusion that though they may all help in a minor degree in establishing a diagnosis, they are involved and complicated methods, and their conclusions when obtained are indecisive.

In a chapter devoted to gastric cancer in the young, Smithies demonstrated that 86 per cent. of his cases satisfied our present day clinical complex of peptic ulcer at some time during a period averaging 4.8 years previous to the onset of symptoms of malignancy.

The second part of this book, dealing with the surgical treatment of gastric cancer, is written by Ochsner. It is well written, lucid, terse, and yet highly practical in its method of dealing with the subject. His own methods of gastrostomy, excision and gastro-enterostomy are described in detail and well illustrated. The use of catgut throughout, for all sutures except those coapting serosa only, is worthy of mention. One of the most important points considered is the after-treatment of the operated case, a point only too often forgotten both by practicing surgeons and by those who write treatises. Ochsner insists upon nothing but water and the simplest of fluids for the first week; after this buttermilk, and cream and egg-albumin are allowed. He considers it inadvisable to give solid food before the sixth week.

Ochsner further claims that by systematic lavage of the stomach, both before and directly after the operation, by permitting the patient to awaken thoroughly before the last stitches are put in place and by great care with the anesthesia, that he has almost completely eliminated post-operative pneumonia.

We note with regret the absence of a chapter on prognosis and duration of life after excision of gastric tumors. It would be most interesting to know the effect of longevity of the patient of these newer methods and observations facilitating the early diagnosis of the condition This is the one essential point lacking in this monograph

The book is one of the most valuable of its kind written, thoroughly modern, exacting in its detailed consideration of all phases of the subject, and most noteworthy because of the recent viewpoint of the authors in their consideration of the frequent causal relationship of gastric ulcer and gastric cancer.

Bone-Graft Surgery. By Fred H Albee, A.B., M D, F.A.C.S., Professor of Orthopedic Surgery at the New York Post-Graduate Medical School and the University of Vermont, etc., etc Octavo; 417 pages; 332 illustrations (3 in color). Philadelphia and New York: W. B. Saunders Co., 1915

It is of course true, as has been said, that Albee did not invent the bone graft and that he was not the first to use an inlay or a sliding graft But it is equally true that he vastly broadened the field of the bone graft, evolved its indications, demonstrated its wide usefulness, and elaborated very nice, indeed elegant, technics and instruments for its employment It is altogether proper, therefore, that inlay bone grafting should be intimately associated, as it is, with Albee's name; and certainly the credit is chiefly his for firmly establishing inlay and peg-bone grafting as an extremely important physiological and therefore surgical method in dealing with many of the diseases, deformities and injuries of the skeleton. His own work, therefore, describing his methods first hand will be, indeed already has been, welcomed by the surgical profession of all lands.

This monograph is neither large nor unduly technical It describes the author's methods clearly and simply and without unnecessary discussion or elaboration. It can be read through without effort or fatigue, and it leaves in the reader's mind no uncertainties concerning mechanical details. It is, moreover, freely illustrated with drawings, radiograms and photographs that demonstrate each step of the operations and their results.

The work is based on an experience in over 400 human cases and much animal experimentation, in which Albee developed his "cabinet maker" mortising and dowelling methods and his motor and its attachments for giving these methods precision.

The first chapter deals with the fundamental principles underlying the use of the above graft in surgery. It covers all the essentials and is terse and to the point, selecting the prominent facts in the history of bone graft studies. It also summarizes indications and contra-indications. One might regret that the author did not enter more fully into histological and his own experimental data; but after all, these might well constitute a monograph in themselves.

The second chapter describes the author's electric motor outfit and its use.

The remaining chapters describe the application of the bone graft in Pott's disease, fractures, congenital and inflammatory bone defects, for joint fixation in infantile paralysis, osteoarthropathy, habitual dislocation of the patella, diseases and deformities of the foot and leg, for remodelling or ankylosing the hip joint, etc., practically all his own operations in methods, and most of them also original in conception

There is an index of authors referred to, but no bibliography. We venture to suggest to the author, for the preparation of his second edition, more care in proof-reading and a little polishing up of his rhetoric.

Autoplastic Bone Surgery. By Charles Davison, M.D., F.A.C.S., Professor of Surgery and Clinical Surgery, University of Illinois College of Medicine, etc., etc., and Franklin D. Smith, M.D., Clinical Pathologist to University Hospital (Chicago). Octavo: 369 pages; 174 illustrations. Philadelphia and New York: Lea & Febiger, 1916.

The present lively interest in the operative treatment of fractures and in bone grafting makes this admirable little work timely indeed. But it is far more than merely timely; it is extremely interesting, suggestive and informative.

The book might be divided into two parts. The first consists of three chapters, which we presume were written by Smith, dealing with the growth and regeneration of bone and the behavior of transplanted bone. It reviews the theories and observations of various investigators and presents many interesting histopathological data based on the author's experiments. As a review and analysis of the subject it is one of the best and quite the most interesting we have read. It displays on the part of its author (or authors?) an admirable scientific spirit and excellent critique. It is a great pity that the writer of such a splendid presentation did not have his manuscript edited by someone who had better command of English construction and more respect for English grammar

The second, larger, part of the book, probably written by Davison, and also excellent, deals with the surgical or mechanical side of the subject. The fourth chapter summarizes the indications for autoplastic bone surgery The fifth chapter describes various instruments required including different types of electric motor driven saws, bone clamps, the Hawley table, etc., and the general technic of bone transplantation The remaining chapters deal with the autoplastic repair for fixation in fractures (old and recent), Pott's disease (Hibbs', Albee's and D[illegible]n's operations), various congenital and acquired bone defects and deformities of the head, spine and extremities, and a few miscellaneous conditions. These chapters are embellished with interesting case reports and splendid pictures. The excellence of the photographs and radiograms, the clearness of the type, and the very thorough bibliography enhance the usefulness and attractiveness of a work which, textually, is of great value.

The Roentgen Diagnosis of Surgical Lesions of the Gastro-Intestinal Tract. By Arial W. George, M.D., Assistant Professor of the Department of Roentgenology, Tufts College Medical School; Consulting Roentgenologist to the Carney Hospital, Boston Dispensary and the Forsyth Dental Infirmary, etc.; and Ralph D. Leonard, A.B., M.D., Assistant in the Roentgen Department of the Boston City Hospital; Instructor in Roentgenology at Tufts College Medical School. Octavo: 306 pages; seven three-color illustrations, eighteen artists' drawings, and 343 Roentgen plate reproductions. Boston: The Colonial Medical Press, 1915. Price, cloth, $10.00 net.

Books dealing with the Roentgen diagnosis of gastrointestinal lesions are not numerous. To place before the reader pictorial evidence of gastrointestinal disorders, rather than explanatory text matter, is sensible, instructive and more or less novel. In doing this, George and Leonard have broadened the field of usefulness for their book, because it thus becomes a valuable asset to almost any medical man.

There is, however, one feature which has been omitted in this book, one which would make it of much greater value to every physician and Roentgenologist as well—namely, the omission of the cases in which the Roentgen diagnosis was wrong. It seems to us that we profit by failures most. If the authors are followers of the direct method school, it is but fair to expect that all their diagnoses were made upon such evidence. It would be very interesting to note upon what evidence the diagnosis was made in cases which proved negative.

The arrangement of the contents in sections is well carried out. The reproductions of the plates are excellent, and the textual description concise and to the point. A careful study of this book by every one interested in gastrointestinal diseases will materially enlarge the scope of Roentgenology and dispel some of the skepticism which still prevails among some members of the profession.

We recommend this book to our readers.

Obstetrics. A Practical Text-Book for Students and Practitioners. By Edwin Bradford Cragin, A.B., A.M. (Hon.), M.D., F.A.C.S., Professor of Obstetrics and Gynecology, College of Physicians and Surgeons, Columbia University. Assisted by George H. Ryder, A.B., M.D., Instructor in Gynecology, College of Physicians and Surgeons, Columbia University. Large octavo; 859 pages; 499 engravings and 13 plates. Philadelphia and New York: Lea & Febiger, 1916.

While in no sense representing any important departure from or improvement on the other American text-books on obstetrics or offering any decided advances in the art of obstetrics, this book is nevertheless welcome in that it reflects the methods in vogue at the Sloane Hospital for Women and that it presents the valuable statistics of that hospital.

The author frankly states that he has made no effort to present a complete bibliography. He has sacrificed much for conciseness. It is obvious that by omitting what is still subject to dispute he has avoided confusion in the minds of the student. On the other hand, it is important to call attention to these gaps in our knowledge, and certainly there are enough of them, even in obstetrics, the oldest, perhaps, of the branches of medical art. The chief items of obstetric interest are however presented in an essentially practical way. Whatever be the viewpoint the student may arrive at through the medium of this book, the latter will be of definite value to practitioners and even specialists in obstetrics as a record of the experience and results of the head of a large metropolitan obstetric service.

Considered, however, as a scientific treatise based on such a vast experience under the most favorable opportunities for observations and investigations, this work falls far short of its possibilities.

Progressive Medicine. Edited by H. A. Hare, Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College, Philadelphia; assisted by L. F. Appleman, Instructor in Therapeutics, Jefferson Medical College, Philadelphia. March 11, 1916. Philadelphia and New York: Lea and Febiger.

The number contains the following reviews: Surgery of the Head and Neck by Chas. H. Frazier; Surgery of the Thorax, excluding diseases of the breast, by G. P. Müller; Infectious Diseases, including acute rheumatism, croupous pneumonia and influenza, by John Rührah; Diseases of Children, by F. M. Crandall; Rhinology and Laryngology, by G. B. Wood; and Otology, by T. L. Saunders. All these reviews are excellent.

The Practitioner's Medical Dictionary: Containing all the Words and Phrases Generally Used in Medicine and the Allied Sciences, with Their Proper Pronunciation, Derivation, and Definition. By George M. Gould, A.M., M.D., author of "An Illustrated Dictionary of Medicine, Biology, and Allied Sciences," etc. *Third Edition.* Revised and enlarged by R. J. E. Scott, M.A., B.C.L., M.D., Editor of Hughes' "Practice of Medicine," etc. Octavo; 962 pages; illustrated; flexible cover. Philadelphia: P. Blakiston's Son & Company, 1916. Price, Cloth, $2.75.

This new edition of Gould's Medical Dictionary combines with practical completeness the qualities of convenient size, light weight and moderate price. The type is clear and readable, though not large. In the book of 8¾x6¼x1¼ inches are defined over 70,000 terms, including those that have recently entered the nomenclature of medical science.

A Practical Treatise on Infant Feeding and Allied Topics, for physicians and students. By Harry Lowenburg, A.M., M.D., Assistant Professor of Pediatrics, Medico-Chirurgical College of Philadelphia; Pediatrist to the Mt. Sinai Hospital; Pediatrist to the Jewish Hospital, Philadelphia, etc. Octavo; 382 pages; illustrated with 64 text engravings and 30 original full-page plates, 11 of which are in colors. Philadelphia: F. A. Davis Company, 1916. $3.00.

The author describes most of the recognized methods of infant feeding and gives a critical review, based upon personal experiences of each. The exposition is clear and systematic and written in didactic style. The text is unencumbered by references. The latter half of the book discusses various infant maladies in which infant feeding is a large factor, such as: atrophy, rachitis, scurvy, vomiting, constipation, diarrhea, etc. We have found the book very useful.

Books Received

Diet for Children. A Complete System of Nursery Diet with Numerous Recipes; also many Menus for Young and Old School Children. A Home and School Guide for Mothers, Nurses, Teachers and Physicians. By Louise E. (Mrs. John L.) Hogan, author of "How to Feed Children," "A Study of A Child," "U. S. Government Bulletin No. 56," etc., etc. Duodecimo; 160 pages. Indianapolis: Bobbs-Merrill Company, 1916.

Handbook of Massage for Beginners. By L. L. Despard, Member and Examiner, Incorporated Society of Trained Masseuses. Duodecimo; 247 pages; illustrated. London: Henry Frowde, Oxford University Press, 1915. Price, $2.00.

Report of the Committee on Fractures of the American Surgical Association for 1915. W. L. Estes, M.D., Chairman, South Bethlehem, Pa. Reprinted from the Transactions of the American Surgical Association, 1915.

Instinct and Intelligence. By N. C. MacNamara, F.R.C.S. Duodecimo; 216 pages. London: Henry Frowde and Hadder and Stoughton, 1915. $2.00.

Progress in Surgery

A Résumé of Recent Literature.

The Postoperative Management of Pyloric Stenosis.

Edward A. Morgan, M.D., New York. *American Journal of Diseases of Children*, April, 1916.

This study is based on the personal observation of fifty cases operated on at the Babies Hospital.

Preparation: Maintenance of the body temperature is of paramount importance. The infant's extremities should be swathed in cotton before and during the operation. The temperature of the operating room should be between 75° and 80°. A hot pad should be placed beneath the baby. Just before operation gastric lavage should be performed. Colon irrigation is unnecessary. Both stimulants and hypodermoclysis should be withheld before operation if possible.

Postoperative Measures: Body heat must be maintained. For the first hour or two the head of the bed should be lowered to prevent aspiration of mucus into the larynx. Hypodermoclysis of normal saline or glucose solution is always indicated (120-240 c.c.). Epinephrin is useful. Transfusion's value is doubtful. A postoperative temperature rise is usual, gastro-enterostomy being followed by higher fever than the Rammstedt or plastic operation. Pyrexia that persists for more than three days should be investigated, as it usually means some complication.

The aim should be to start nourishment as soon as possible after operation. Breast milk should be procured if in any way possible, especially for the first week. The routine now followed after the plastic operation is to begin feeding one hour after operation. First 16 c.c. of water are given, and one hour later 12 c.c breast milk diluted with 4 c.c. water. This is increased up to 16-24 c.c undiluted breast milk q. 3 h. at the end of 24 hours; 20-30 c.c. at 48 hours and 30-45 c.c. at 72 hours. Water must also be given.

Vomiting frequently occurs and is most commonly due to distention from gas accumulation. Elevating the head of the bed may be of considerable use.

As a rule there is no stool for the first twenty-four hours after the operation, and at this time a teaspoonful of castor oil should be administered. Not infrequently a diarrhea occurs in those children who have had a gastro-enterostomy done. This may be difficult to control and is one of the most serious objections to this type of operation.

The prognosis depends on the duration of the disease, the preoperative condition of the child, the nature of the operation, and the experience of the surgeon. Of 50 cases here reviewed, fourteen died, a mortality of 28 per cent. Fifty per cent. of the deaths occurred in the first thirty-six hours after operation, so that, until the infant has passed through this danger period, the prognosis should be very guarded. After five days of uneventful progress the parents may be reassured as to the ultimate outcome.

The Normal Stomach: Its Size, Position, Form, Tone, Peristalsis and Mobility From a Radiographic Standpoint.

C. Winfield Perkins, M.D., New York. *The Medical Press and Circular*, March 22, 1916.

Peristalsis does not seem to exert any influence on the tone of the stomach, for we may have exaggerated peristalsis with a hypotonic stomach and diminished peristalsis in a hypertonic stomach.

There are no determined fixed points of any type of stomach in the abdominal cavity, except the cardiac portion.

A stomach may be of any of the types and yet be normal from an *x*-ray standpoint.

The average normal stomach is orthotonic. The usual position of the orthotonic stomach is as follows: Greater curvature (lowest point) one to two inches above the interspinous line, either median or to the left; lesser curvature (lowest point) three to four inches above the same line, median or one to two inches to the right.

The pylorus is placed two or three inches above the line in the median position, or one and a half inch to the right.

The axis of the stomach is vertical and parallel to the median line.

The length is eight to ten inches and the width three to three and a half inches.

The tendency of the male stomach is always toward hypertonicity, while that of the female is toward hypotonicity.

The stomach is not, as a rule, as high in the abdominal cavity as many text-books of anatomy teach. There is no structure in the human body, however, that has such variations in form, tone, and position.

The radiographic examination, either by the fluorescent screen or plate, is the only accurate method of ascertaining the anatomical position, form, peristalsis, and mobility of the stomach. Therefore, revolving in mind that the type of stomach fits the patient, a chart of the relative positions of the stomach should be of service to the clinical diagnostician in locating pathological lesions of the organ; that is, if he has not *x*-ray methods at hand. Such a chart should also be of service to the radiological technician in locating points for radiographic work.

Appendectomy Under Local Anesthesia.

J. Wiener, New York. *Journal of the American Medical Association*, April 8, 1916.

Wiener says that in the last eleven months he has operated on fifteen cases of appendicitis under local anesthesia with very satisfactory results to himself and his patients. To anticipate objections he says the first will be the difficulty in dealing with adhesions. Fibrous adhesions are not sensitive and can be easily divided. The omental adhesions can be readily anesthetized by injecting a few drops of the local anesthetic. A few of his cases have been acute, but he hopes to use the method in more of this class of cases, even in the presence of a peritonitis. In the cases in which he has operated under local anesthesia there has been very little or no tympanites, and peristalsis has been little or not at all inhibited. In a recent case, gas began to be passed fifteen hours after operation. Abdominal discomfort, nausea and tympanites were absent. Half an hour before operation he gives a hypodermic of a quarter-grain of morphin. He usually uses a 1 per cent solution of novocain to an ounce of which twenty drops of a 1:1,000 solution of epinephrin are added. As much as 240 minims of this can be safely used for an adult, but as a matter of fact he has never had to use as much for a painless appendectomy. He prefers the muscle splitting McBurney incision, which lends itself well to the local anesthesia operation. The solution is first injected into the skin along the lines of the cut and followed up by deeper injections along the same lines. The skin and subcutaneous tissues are painlessly incised down to the aponeurosis of the external oblique with a sharp scalpel rather than with scissors. The novocain is then injected under the external oblique aponeurosis, and after two minutes this is divided. It is next injected into the internal oblique, and after another wait of a few minutes this is incised. Then a little novocain is injected under the peritoneum and it is divided in three minutes more. The manipulation should be as gentle as possible. As soon as the cecum with the appendix is exposed some novocain is injected into the mesenteriolum to prevent cramplike abdominal pains. After a wait of three minutes the appendix can be pulled out of the abdomen, the mesentery ligated and divided, and the appendix removed with almost no pain. He has kept a record of the statements of the patients concerning their feelings and they have stated that whatever pain they felt was much less than they expected. A few hours after operation there may be a little wound pain readily controlled by codein or morphin. Peristalsis is early and almost all of the patients have been able to take and retain fluids within a few hours. The postoperative depression common after ether is entirely absent. The patients are usually able to get out of bed on the fourth day and to leave the hospital on the seventh or ninth day. An ordinary uncomplicated operation can be performed in from twenty to thirty minutes, much of the time being used in waiting for the anesthetic to act on each layer. Besides the intermuscular incision, the operation can also be done under local anesthesia by any other incisions used in appendectomy.

Non-Adhering Surgical Gauze. H. E. Fisher, Chicago. *Journal of the American Medical Association*, March 25, 1916.

Fisher describes the paraffin impregnated gauze used by him as a medium sized mesh material impregnated with boiling paraffin and white petrolatum, and allowed to dry while being constantly agitated so as to get rid of the excess paraffin between the meshes. When dried it is very flexible, and presents a waxed screen when placed in contact with the wound. Fluff dressing is placed above it, and when removed carries away the secretion from the wound, leaving the raw surface practically dry. The paraffin is not absorbed by the tissues and the granulations do not cling or become attached to the waxed surface. The petrolatum seems to make the gauze more flexible, and prevents the hardening and stiffening effect of the paraffin. Its advantages are summed up as follows: "1. It does not become matted with secretions and débris from the wound, owing to its waxed fibers. 2. The paraffin is not absorbed by the tissue. 3. The granulations of tissue repair do not cling or adhere to the waxed gauze, as is the case with all other surgical gauze used. 4. The nonadhering gauze will not adhere to wounds when left on for any great length of time. 5. It stimulates tissue growth. 6. Because of the flexibility of the nonadhering gauze, it closely conforms to the surface to which it is applied. 7. It causes no pain to the patient at the time of application or while it is in place on the wound. 8. No pain or discomfort is caused the patient when it is removed from the wound. 9. Owing to its being a dry dressing and free from matting, it permits of adequate drainage of wound secretions. 10. It is easily and quickly sterilized by immersion in absolute grain alcohol for days without impairing its usefulness. 11. Two years' treatment of wounds of all varieties has shown its decided advantages over all other dressings in use. 12. There is freedom from infections during its use. 13. When allowed to remain on indefinitely, it becomes separated of itself, leaving the healthy, healed wound underneath. 14. By these advantages it hastens the convalescence or healing of wounds. 15. Application to clean surgical operations on the line of suture prevents adherence of the ordinary gauze dressing. 16. It is of value in covering skin graft cases, as it permits freedom of drainage."

Acute Dilatation of the Stomach: Complicating Operations on the Extremities. Isidore Cohen, New Orleans. *Annals of Surgery*, March, 1916.

Cohen presents a rather extensive review on this subject, quoting cases and authorities, and then cites five cases from his own records. He discusses at considerable length the theory advanced by others that acute dilatation of the stomach is caused primarily by compression of the duodenum by the root of the mesentery. His conclusion is that the condition is due, most likely, to a disturbance of innervation rather than to a mechanical obstruction. The important facts in support of this theory are: (1) The nerve supply of the stomach and intestines are intimately connected. (2) The inhibitory nerve supply of the stomach and intestines is identical—the splanchnic. (3) Impulse applied to the splanchnics cause a cessation of peristalsis and therefore (4) an acute dilatation of the stomach, etc. (5) Obstruction by the mesentery and its vessels is not present in over fifty per cent. of the cases.

A Note on the Abuses and Dangers of Drainage Tubes. Major G. Grey Turner, R.A.M.C. (T.) *The British Journal of Surgery*, January, 1916.

The author writes on this subject from a twelve months' active experience in war surgery. He states that a common fault is the use of tubes of colossal size, out of all proportion to the necessities of the particular case. He finds it never necessary, in military surgery, to use tubes larger than the diameter of an ordinary adult little finger. Another error is to allow tubes to remain in the wounds for too long. Very often counter drainage will do away with the need for a very long tube, will be more efficient, and will permit of a much earlier removal of all tubes than if one very long tube were employed.

The greatest danger lies in ulceration and perforation of blood vessels, caused by drainage tubes. This result is nearly always due to sepsis and pressure. He therefore holds it wrong to leave a drainage tube in contact with an artery for more than two days, when the area involved is infected. He boils his rubber drains for ten minutes immediately before using.

Volvulus of Meckel's Diverticulum. A. S. Frasier, Dothan, Ala. *Journal of the American Medical Association*, April 15, 1916.

Meckel's diverticulum is present in some form in 2 per cent. of individuals, and is a rather common cause of intestinal obstruction. This is pointed out by Frasier, who mentions that when it becomes inflamed the symptoms closely resemble those of appendicitis and may be the cause of serious mistakes in diagnosis, the innocent appendix being removed and the real offender left untouched. The case he reports was diagnosed as acute gangrenous appendicitis with rather unusual obstructive features, probably due to paralytic ileus. The high location of the tenderness and the obstructive feature did not suggest the diverticulum as the cause at the time. Exploration, however, revealed a Meckel's diverticulum 4½ inches long, averaging 2 inches in diameter, coming off about 18 inches above the cecum. It was twisted a complete turn and its distal end enormously distended and adherent to the ileum about 12 inches form its origin. The proximal end communicated with the ileum by an opening 1 inch in diameter. Gangrene was threatened and rupture imminent. The obstruction was believed to be due to ileus dependent in some way on the twist in the diverticulum. The adhesions were freed without difficulty, the diverticulum ligated and removed, the stump inverted and the wound sewed. The patient's convalescence was uneventful.

Cauterization and Fulguration of Bladder Tumors. H. A. Kelly and Mr. Neill, Baltimore. *Journal of the American Medical Association*, March 4, 1916.

Kelly and Neill says that the past ten years have witnessed a remarkable and beneficent change in the treatment of bladder tumors by fulguration, for which credit belongs to Beer. "He has reduced the complex to the category of the simple, always a notable surgical achievement, so that now instead of putting these patients to bed and exposing them to the risks and discomforts of an operation, we treat them as ambulatory office patients and destroy the growth often in from one to several sittings." The greatest benefits are realized in recurrent cases as the patient continues the treatment at intervals until the trouble is finally eradicated, instead of having to undergo a new operation, and a siege in the hospital. There is, nevertheless, a border-line between cases manifestly best for fulguration and a small group which Kelly and Neill are still inclined to reserve for surgery. They believe that the open aerocystoscope (Kelly's) has incontestable advantages for seeing these growths, determining their number and relations, and especially in most cases in enabling the surgeon to see and handle the pedicle and distinguish the pedunculated tumors from apparently sessile and malignant ones, and also to shorten the period of treatment by attacking the pedicle at once. They have found that two slightly diverging needles are valuable for fulguration. They are plunged into the substance of the pedicle and the current turned on as strong as the patient can stand it. They also can use the platinum cautery knives, formerly so much used in throat work, with the open cystoscope with greater advantage.

Vesiculotomy and Vesiculectomy L. E. Schmidt, Chicago *Journal American Medical Association*, January 15, 1916.

Schmidt says that the indications for surgical attack on the seminal vesicles still remain uncertain, though much has been done toward a more thorough understanding. On account of anatomicopathologic conditions, it may be that vasotomy may not always be of benefit, but on account of its simplicity and the more formidable magnitude of the direct attack on the vesicles it should always be considered, except when it can be ruled out on examination. The pathology of the gonorrheal or secondarily involved vesicles must be similar to that of other organs of like structure Naturally, the questions of varying virulence of infection arise, as also whether the course is acute or chronic, the questions of obstruction, involvement of other parts, etc. It is probable that the direct or indirect drainage of these organs has not yet received due attention. Schmidt's own observations and those of others show that the gonococcus is not the germ which is the one most often found. It may pave the way for secondary infection, but the organisms of the latter are, in their order of frequency, the staphylococcus and the colon bacillus. The gonococcus may also be present in some chronic cases. As to the symtomatology, Schmidt quotes Belfield, who has grouped all symptoms as referrable to (1) the genital organs, (2) urinary organs, (3) rectum, (4) abdomen, or as (5) systemic. Schmidt holds that an epididymitis is always a positive indication of a vesiculitis on the corresponding side and blood in the semen is equally positive, in his opinion, even if it is not detected by the examining finger. Pains in the testes, groins or perineum or in the region of the vesicles should also be considered. Colicky pains have also been mistaken for ureteral colics and been operated on as such. The urinary symptoms include painful urination, the pain usually terminal, increased frequency, dribbling, colicky pains, etc. Partial or complete retentions are rather common. Rectal symptoms are feelings of itchness, bearing down sensations, etc. Abdominal symptoms are chiefly intestinal in character. Systematic symptoms in acute attacks are chills, fevor, malaise, headache, etc. In regard to operations, he lays stress on avoidance of hasty work and if minor procedures can give relief they should be the methods of choice. When operation is necessary in the acute case and there is no question of pseudo-abscess, and grave symptoms are present, vesiculectomy is the method of choice, and these cases should not be handled too conservatively. In cases of marked infiltration with adhesions, even when systemic symptoms are absent but the bladder involvement is apparent, he favors this operation, as also in cases with colicky pains. Undoubtedly the functional results of the operation have not yet been thoroughly studied, but his impression would be that sterility might easily result. It is likely, however, to result without operation and each case must be analyzed by itself. Schmidt describes the anatomy of these vesicles and gives the technic of the operation that has given him satisfactory results.

Surgical Treatment of Kidney Inflammation. (*Chirurgische Behandlung der Nierenentzündung.*) Dr. S. Wilk, *Münchener Medizinische Wochenschrift,* January 18, 1916.

Wilk reports four cases of kidney inflammation in soldiers who were otherwise perfectly fit and strong, but who were brought to the military hospital with the symptoms of very severe kidney insufficiency. There was general marked edema; pressure into the skin was comparable to the same in a mass of dough. They had to be turned frequently in bed because prolonged posture caused the parts to be spread out as flat as "pancakes." The serotum was enlarged to the size of a head, etc. There was diminished urine output; costs and albumin and now and then a red blood cell were seen in the urine. Albumin content of the urine was 8 to 17 promillimeter. The functional tests showed a distinct delay 20 to 30 minutes. The general condition was so bad and medical treatment unavailing, that Wilk subjected these four patients to surgical operation. He decapsulated one kidney only and chose the side which the patient appeared to lie upon and to favor mostly. In two cases the right kidney was decapsulated and in two cases the left kidney. In all four cases there was distinct evidence of perirenal inflammation; thicker and more delicate adhesions bound the capsule to the fat and surrounding connective tissue. The kidney was found enlarged to twice the normal size and in one case with large albumin output to three times the natural size. The capsule was easily split and separated from the cortex This was found in all cases to be intensely congested and cyanotic Bleeding was free. This was controlled by continuous irrigation of hot saline solution. The operation was performed by combined local and ether anaesthesia, was borne well by the patients and the convalescence was rapid in each. The general anasorca was rapidly improved; the urinary output almost immediately increased. Hematuria post operative lasted only a few days. The urine cleared up so that after three weeks only faint traces of albumin were detectable; no casts. The patients were put on the ordinary diet to which they had previously been accustomed within three weeks after operation and went on to make a complete recovery.

The decapsulation of one kidney sufficed. The other kidney could also be decapsulated in case of necessity. The procedure is recommended by the author, particularly where internal treatment has failed and especially in the case of soldiers attacked during the war.

The Manual Expression of the Bladder in Injuries of the Spinal Cord. (*Zur manuellen Expression der Blase bei Rückenmarksverletzungen.*) Fritz Erkes, *Münchener Medizinische Wochenschrift,* No. 7, February, 1916.

Erkes reports a case of vesical paralysis following a shot injury to the spine. The bladder was emptied by uniform pressure applied on all sides of the bladder region. In this way catheterization with its attendant dangers was avoided. There was, however, in the patient whose history is reported a perforation at the fundus of the bladder, which had been tamponaded spontaneously, as it were, by a loop of the sigmoid. The manual emptying of the bladder forced this loop of gut to be separated, with the result that fatal peritonitis set in. The author recommends this procedure only in the immediate interval following the injury to the spine before pathological changes set in within the bladder walls that predispose to rupture.

A Danger of Pyelography. (*Ueber eine Gefahr der Pyelographie.*) Prof. M. Simmonds, *Münchener Medizinische Wochenschrift,* No. 7, February 15, 1916.

A patient 34 years of age, with symptoms referable to the right kidney, had an injection of 15 c.c. of 5 per cent. collargol. In three days he was dead with general signs and symptoms of an acute hemorrhagic sepsis. The hemolytic streptococcus was recovered from the blood. The death is therefore not to be ascribed to the collargol itself but rather to the transportation by its medium of septic bacteria from some part of the bladder, urethra or ureter into the blood stream. The collargol solution should therefore not be considered as sufficiently bactericidal. Hence in pyelography a great deal of pains should be taken in determining whether the bladder mucosa is infected, and if so to avoid this procedure; also to avoid injuring the kidney parenchyma by forcible injection of the collargol solution.

The Diagnosis of Genito-Urinary Tuberculosis. J. W. Churchman, New Haven. *Medical Record,* March 18, 1916.

According to Churchman, an ascending tuberculous infection of the kidney is so rare as to be excluded from consideration. Churchman emphasizes a number of insufficiently appreciated data in connection with tuberculosis of the kidney. 1. That tuberculosis of the kidney may occur in an individual otherwise healthy. 2 That renal symptoms are the exception rather than the rule. 3. That an impalpable kidney is not only no indication of the absence of renal infection, but also is no proof of the absence of enlargement of this organ. The most important diagnostic sign of tuberculous kidney is the presence of tubercle bacilli in the urine. It is possible, however, to find this sign absent. In the female an important diagnostic sign of renal tuberculosis is the palpation of the thickened lower portions of the ureter per vaginam. The cystoscope usually makes the diagnosis easy Roentgenography is of very little value.

Needless Surgical Operations from Failure to Recognize Tabes Dorsalis. John W. Nuzum, Chicago. *Journal of the American Medical Association,* February 12, 1916.

In the five years from 1910 to 1915 over 1,000 cases of tabes were carefully studied and the records examined to determine the relative frequency of the cardinal symptoms, the number of patients operated on, the frequency of gastric crises, etc. In estimating the number of operations only those cases in which nothing wrong was found and the old symptoms have returned after the operation are included as of the kind here discussed. The mistake is not confined to only one locality, and it was found in the study that such operations are fewer in the larger hospitals than in the smaller ones throughout the United States. Nuzum records 97 operations performed on 87 patients. There were 19 operations on 18 patients for gastric ulcer; 19 operations on 16 patients for gallbladder disease; 18 operations on 17 patients for appendicitis. Eleven patients were operated on 13 times for salpingitis; on 9 patients an exploratory laparotomy was made; 7 operations were performed on 6 patients for renal calculi; 7 operations on 5 patients for postoperative adhesions, and one operation for each of the following: tumor of cauda equina, sciatica, meningocele, ectopic gestation and peritonitis. The crises of tabes must have largely influenced the decision to operate. It appears that the mistaken diagnosis and resulting operations were chiefly in two groups of patients: 1. Tabetics in whom the initial symptoms were the visceral crises and less frequently those with renal or intestinal crises. 2. Tabetics as a class designated by Erb as "tabes incompleta" or "formes frustes" by the French. These present fewer of the characteristic symptoms and mistakes are less surprising. The possibility of bona fide abdominal disease occurring in paretics must be kept in mind, and a case illustrating this is given. Nuzum mentions a recently found symptom very valuable for the early diagnosis of tabes in the marked lymphocytosis in the spinal fluid.

Malignant Disease of the Ovaries. M. F. Porter, Fort Wayne. *Journal of the American Medical Association,* March 11, 1916.

Porter reports several new observation. While the bilateral tendency of ovarian growths is recognized and some have advised removal of both ovaries when one is necessarily removed because of tumor, Porter, from a quite large experience, has had only one case in which he has been called on for removal of a cyst in the remaining ovary after a previous operation on the other, and he would not advise such removal, as has been recommended in these cases by Clark. He considers that fluid in the abdomen without general anasarca, provided pericarditis and cirrhosis be excluded, calls for exploratory laparotomy in a woman, adult as well as child, and that this is almost imperative. Speaking of tumors generally he would say that negative reports from the laboratory should never be allowed to outweigh, when based on only a few sections, the evidence gained by examination of the gross specimen and from the clinical history. On the other hand, one frequently meets with tumors which give little macroscopic evidence of malignancy, but show it on microscopic examination. While ascites with ovarian tumor indicates malignancy, its absence does not necessarily mean the contrary, nor does such ascites with malignant tumor mean necessarily an involvement of the peritoneum. Just why some of the tumors are accompanied by ascites, and others are not, is not explained. Concerning the influence of malignant ovarian tumors on the menstrual function, cases are met with in which they seem to cause amenorrhea, and others in which they seem to produce menorrhagia or metrorrhagia. These opposite effects, he thinks, may be explained by the overgrowth of the ovarian structure on the one hand and its destruction on the other. In some patients, however, one of these conditions may follow the other and the explanation is not apparent to him. He thinks that we are warranted in concluding that menorrhagia or amenorrhea is much more common in malignant tumors of the ovary than with benign, and that both forms of irregularity are equally indicative of malignancy.

The Bacteriology and Experimental Production of Ovaritis. E. C. Rosenow and C. H. Davis, Chicago. *Journal of the American Medical Association,* April 15, 1916.

Rosenow and Davis publish their findings with cultures made from tissues and the cystic fluid after operations on the ovaries, and give results of animal experiments made with organisms obtained from these cultures. Their results seem to point to the fact that ovarian infection may be of extrapelvic origin instead of direct extension from the genital tract. Their technic was the same as used in the similar studies of other diseases. Shake cultures were made in tall columns of ascites-dextrose agar from one or more portions of the ovary, at least 1 cm. in diameter previously emulsified in a specially devised sterile air chamber. Positive cultures of streptococci, the viridans, and *Staphylococcus albus,* the gonococcus, the colon bacillus, and an aerobic streptothrix were obtained. The Welch bacillus was also obtained in eight patients with fibromyoma of the uterus. The following facts are adduced as supporting the causation of ovarian disease by organisms carried in the blood more often than generally believed: the occurrence of fibrocystic degeneration of the ovaries in a young woman with imperforate vagina, history of tonsillitis followed by symptoms of pelvic infection in a number of patients in the series, the not uncommon occurrence of pelvic infection following anginal attacks during the menstrual period, and the far more frequent occurrence of a so-called idiopathic streptococcal peritonitis following anginal attacks in the female than in the male, the absence of colon bacilli in all but three ovaries of their series, contrary to what was naturally to be expected, and the frequent occurrence of appendicitis, cholecystitis and arthritis in these patients, diseases commonly attributed to streptococci from a distant infection focus. The occurrence of fibrous and cystic degeneration of the ovary secondary to an acute infection is well established, but the cause of this condition without an acute infection has not been previously worked out. The authors have demonstrated streptococci often in pure culture in a large proportion of the ovaries studied, and two of the strains isolated showed marked affinity for the ovary in the experimental animals. Their results do not indicate, however, they think, that excision and resection of the ovary should not be done without due regard to the existence of chronic foci of infection elsewhere where the bacteria may acquire the peculiar properties necessary to infect the ovary. Early eradication of primary foci might in some cases prevent the premature sclerotic degeneration of the ovary.

Tuberculosis of the Mammary Gland. D. Gatewood, Chicago. *Interstate Medical Journal,* April, 1916.

1. Tuberculosis of the mammary gland is very uncommon considering the frequency of tuberculosis.

2. The term "primary tuberculous mastitis" should be applied only to those cases in which there is definite evidence that the infection was introduced directly into the breast tissues.

3. The symptoms are varied and the diagnosis should be made certain by the aid of the microscope before radical operations are undertaken.

4. The pathology, although varied, does not differ essentially from that of tuberculosis in other organs.

5. The treatment is surgical in almost every instance, but the postoperative care of the patient is very essential to complete recovery.

6. The prognosis is excellent provided the general condition of the patient is good.

The Ideal Operation for Aneurisms of the Extremity. Report of a Case. B. M. Bernheim, Baltimore. *Bulletin of the Johns Hopkins Hospital,* April, 1916.

A man, aged 43, presented himself for an aneurism of the popliteal artery of syphilitic origin. The Moskowicz test revealed insufficient collateral circulation, so that an aneurysmorrhaphy was not considered feasible. At operation the aneurism was found adherent to the popliteal vein. The aneurism was widely opened and the vein separated from the artery by taking part of the sac wall with it. The aneurism was then excised, leaving a part of the wall in situ, and 12 cm. of the internal saphenous vein was sutured between the divided ends of the popliteal artery; the portion of aneurysmal wall left in situ was used to reinforce the vein. The ultimate result was perfect in every way. This is the first report of the "ideal" operation for aneurism in this country, and only seven have been reported elsewhere.

Subacromial Bursitis and Concretions. W. W. Plummer, Buffalo. *New York State Journal of Medicine*, April, 1916.

From a study of five cases Plummer is in full accord with the clinical, pathological and therapeutic observations of Brickner upon this malady. The main points of emphasis to which Brickner has called attention in his publications are the following: 1. That trauma is probably the determining etiological factor. 2. That the bursitis is usually associated with a tear or injury in the supraspinatus or infraspinatus tendon and deposition of lime in or on this tendon. 3. That the lime deposit is therefore under and not in the bursa. 4. That thickened bursae are not visible in radiographs. 5. That in chronic cases the best treatment is by open operation, dividing adhesions in the bursa and removing the deposit beneath. 6. That abduction of the arm after operation is desirable to accelerate a perfect functional result.

Retarded Ossification as an Etiologic Factor in Traumatic Arthritis and Epiphysitis. J. M. Berry, Albany. *Journal of the American Medical Association*, March 18, 1916.

Retarded ossification as an etiologic factor in traumatic arthritis and epiphysitis is noticed by Berry. He has had the opportunity of observing three cases in which it appeared to be such a factor, and which he reports. The trauma in these cases consists in overstrain of the joints due to abnormal activity, and children that are thus anatomically delayed in development should be restrained from their natural overactivity. Cases of this character, he thinks, are probably quite common and are apt to be overlooked or unrecognized.

Treatment of Tuberculous Arthritis. J. J. Nutt, *American Journal of Orthopedic Surgery*, January, 1916.

The author claims little value for Bier's hyperemic treatment, tuberculin, heliotherapy, or Beck's bismuth paste. He emphasizes the fact that in strict attention to the patient's general condition lies the greatest hope for amelioration of these joint conditions. To outdoor life with properly regulated diet he occasionally adds a milk diet. The patients are permitted to run and play practically as they care to, except for one or two enforced rest periods through the day. Mechanical appliances are readjusted every day if necessary (he prefers the use of braces to plaster jackets). The resistance of the joint is well tested by the removal of all protection, and by frequent examination over a period of six months.

The Conservative Treatment of Gangrene of the Extremities, Due to Thrombo-Angiitis Obliterans. Willy Meyer, New York. *The Annals of Surgery*, March, 1916.

Meyer presents a careful review of gangrene of the extremities, its etiology, its pathology, and its treatment. He advises that in typical cases of thrombo-angiitis conservative treatment should first be resorted to. (1) Superheated air; best combined with (2) systematic hypodermoclysis of Ringer's solution. One tabloid of Ringer's solution is dissolved in 500 c.c. of *distilled* sterile water. The injections are made every day or every second day up to twenty-four injections. This method, which Meyer designates as the Mayesima-Koga treatment, deserves particular attention, since by its use Meyer has frequently seen improvement. If these two procedures are of no avail, then conservative operative measures are indicated, such as (3) tying the femoral vein, or (4) arteriovenous anastomosis. Finally, there remains amputation as the last resort.

Parapneumonic Empyema. Linton Gerdine, Chicago. *American Journal of Diseases of Children*, January, 1916.

A consideration of the literature on this subject, and a series of personally observed cases, leads the author to the following conclusions:

Fluid is present in the pleural cavity in a large number of cases of pneumonia before the crisis and can be demonstrated, sometimes by physical signs, sometimes by the Roentgen ray, and by puncture, even when other signs are not apparent. The clinical course of the pneumonia may not be altered by this complication. In the majority of cases the fluid is sero-fibrinous and sterile. True pus is only rarely present and may contain organisms, whose virulence may aid in determining the prognosis. Only in cases with sero-fibrinous and purulent fluids, containing organisms of a high grade of virulence should surgical interference enter into consideration.

A Simple Method of Draining Empyema. J. Ransohoff, Cincinnati. *Journal of the American Medical Association*, April 15, 1916.

A simple method of draining empyema and at the same time avoiding the entrance of air into the pleural cavity, which is most distracting to the patient and detrimental to the lung expansion, is described by Ransohoff as follows: "An ordinary drainage tube is slipped into a collapsible soft rubber tube, which must fit accurately about the harder one for a distance of 1 inch or more. The soft tube is that ordinarily employed for cigarette drainage. When the harder tube is accurately fitted into the wound, any effort at inspiration will cause the soft outer tube to collapse and prevent the ingress of air. On the other hand, the pressure of the lung from within, with the normal respiratory movements, will be sufficient to open the collapsible tube and permit the escape of whatever pus may be within the chest. While the drainage is profuse, the collapsible tube can be led into a bottle, which may be changed as often as is necessary. With the decrease of the discharge, the bottle can be dispensed with and the discharge guided into the dressings. It is almost needless to say that the inner drainage tube must be made to fit air-tight into the wound in the intercostal space, whether or not a rib resection has been done. A suture or two through the wound margin and the proximal tube will prevent the latter from slipping into the thorax." In case it is desired to apply suctions through the tube a glass tube fitted to a Potain aspirator can easily be slipped through the collapsible tube into the firmer one without admitting air.

Contribution to the Combating of Collapse in the Exsanguinated. (*Beitrag zur Bekämpfung von Kollapsen bei Ausgebluteten.*) Dr. Nowakowski (from a field hospital), *Münchener Medizinische Wochenschrift*, January 25, 1916.

Two things are emphasized in this paper, 1. The value of rectal infusion by the drop method as superior to subcutaneous and intravenous infusion, being less prone to cause cardiac insufficiency in wounded soldiers already debilitated by the hardships of long marches, hunger, thirst and cold and wet, and 2. The great value of oxygen inhalations at frequent intervals. The latter is especially valuable in combating the severe air-hunger and unconsciousness. It deepens the respirations, stimulates the respiratory centre, not only supplies the gas to the red blood corpuscles but by prolonging the respiratory act permits the red cells to load themselves with the vital gas. The pulse gets fuller at the same time and the patients ask for the inhalations. While the other well recognized measures are to be employed to combat the collapse from exsanguination as camphor and caffein injections, warmth, elevation of the lunar extremities, stimulating fluids by mouth, etc., the greatest benefit comes from the inhalation of oxygen, which should always be at hand, and should be prolonged till the collapse phase has been overcome. Inhalation may be given at periods and may last between 3 and 10 minutes. Should anesthesia be necessary for dressings or operative manipulations the oxygen becomes then a valuable adjunct

On the Condition of the Vaso-Constrictor Center During the Development of Shock. M. G. Seelig and Don R. Joseph, St. Louis. *Journal of Laboratory and Clinical Medicine*, February, 1916.

1. Denervated bloodvessels usually show the best passive response to intrenal pressure changes when used within 24 hours after their denervation.
2. Normally innervated ear vessels are strongly constricted while the animal is sinking into a condition of shock and after shock has developed.
3. This strong vascular constriction persists even though the blood pressure be raised well toward the normal level (at a time when the animal shows distinct symptoms of shock).
4. This vasco-constriction is due to the activity of the vasco-constrictor center because (a) the control denervated vessels become strongly dilated under the influence of the same pressure and (b) the constriction of the normal vessels themselves disappears at once if their connection with the vasco-constrictor center is destroyed by cutting the nerves, or by abolishing their conductivity with ether or by freezing.
5. Since a fairly high degree of activity of the vasco-constrictor center can be demonstrated even after the blood pressure has fallen to a low level and reflexes are sluggish we believe it is justifiable to conclude that a paralysis or failure of the vasco-motor center is not the *primary* cause of the other symptoms of surgical shock.

The Treatment of Acute Toxemia Secondary to Gas Gangrene by the Intravenous Injections of a Solution of Hypochlorous Acid. John Fraser and H. Bates. *British Medical Journal*, January 15, 1916.

Fraser and Bates have found that many patients with gas bacillus infection die from a profound toxemia, even when the local condition seems to have been arrested. They report three cases in which the improvement after the injection of hypochlorous acid was profound and immediate. The solution employed was lusol containing 0.5 per cent. hyphochlorous acid, to which was added 8.5 grains of sodium chloride to the litre. The injection is made into the median basilic vein by a syringe and the amount is from 40 to 70 c.c.

Types of Hydrocephalus: Their Differentiation and Treatment. Chas. H. Frazier, Philadelphia. *American Journal of Diseases of Children*, February, 1916.

Frazier believes the old classification of hydrocephalus into an internal and an external variety should be given up, and proposes that cases be grouped under four headings, as follows:

1. Hydrocephalus obstructious: This is the old "internal" variety and is due to blocking of one of the outlets for cerebro-spinal fluid. This may be caused by a congenital defect, as absence of the Sylvian aqueduct, or by an inflammation. This group is not as large as was formerly believed and must be differentiated from the other varieties, as the treatment is different.
2. Hydrocephalus nonabsorptus: The absorption of the cerebro-spinal fluid is delayed or defective as proved by the phenolsuphonephthalein test.
3. Hydrocephalus hypersecretivus: This variety is probably due to a diseased condition of the choroid plexes, which structure has been shown to secrete the cerebro-spinal fluid.
4. Hydrocephalus occultus: This condition, occurring usually in children, is characterized by an excess of fluid without any enlargement of the skull. Symptomatically the condition resembles a brain tumor. The author describes in detail such a case—operated upon and relieved.

The author next gives in detail the tests used to determine the variety of hydrocephalus. Phenolsulphonephthalein is injected in the urine estimated; and second, phenolsulphonephthalein is injected into the ventricle and its excretion into the spinal canal is tested for. With these two tests it is possible to localize an obstruction if there is one.

In discussing treatment Frazier advocates in the obstruction type, the puncture of the corpus callosum, as advocated by Anton and Bramann. In the non-absorptive type drainage into the pleural cavity is advocated, though this procedure is still in its developmental stage. When the lesion is due to hypersecretion, thyroid feeding should be prescribed. A case is reported in detail in which thyroid treatment was very successful.

Further Experiences in the Treatment of Hydrocephalus by Cisterna-Sinus Drainage (Author's Operation). Irving S. Haynes, Ph.B., M.D., New York City. *New York State Journal of Medicine*, April, 1916.

The author discusses the treatment of hydrocephalus by operative procedures and believes that such treatment is logical.

The cerebro-spinal fluid is formed in the lateral ventricles as an active secretion of the choroid plexuses. Its normal course is through the internal channels of the brain and out into the cisterna magna. From here it spreads throughout the entire subarachnoid space, cranial and spinal, and is absorbed by the capillaries of this space, ultimately reaching the cranial sinuses and spinal veins. Hydrocephalus is due to interference in the course of the current or its absorption from the subarachnoid space. Any operation to be successful should reproduce the course of the fluid into the blood stream.

In the writer's operation the object is to drain the fluid from the hydrocephalic cavity at the base of the skull into one of the easily accessible sinuses, the lateral or occipital, if it is large enough, or into the torcular itself. The means is by the use of a small silver cannula of one to two mm. diameter. There is a short arm about one-quarter inch long and a long arm of one to two inches. These arms are bent at right angles to each other. The operation consists of permanently fastening this cannula into the sinus and into the subarachnoid space.

Haynes reports twelve cases in which this operation was done. There were five deaths. The remainder were improved, but none were permanently cured.

A New Method of Treating Tuberculosis and Other Chronic Infected Sinuses. A Preliminary Report. W. O. Sweek, Phoenix, Arizona. *Interstate Medical Journal*, March, 1916.

The author reports the results of both clinical and experimental tests of a new method of destroying pathogenic organisms in sinuses and other chronic wounds. The wounds are subjected to a germicidal gas produced by passing air through rectified spirits of rosin and then subjecting this to an arc of high electric voltage. The product fresh from the arc has no irritating properties. The time necessary for germicidal action to be complete is twenty minutes for the fresh product and three to five minutes for the aged product. Wound healing is not retarded to any perceptible extent. Infected wounds heal more quickly than with any other known germicide.

Sialolithiasis and Sialodochitis in Childhood. Harold Neuhof, New York. *The American Journal of Diseases of Children*, March, 1916.

Neuhof describes three cases of salivary calculus and two of chronic inflammation of the salivary glands, thus showing that these conditions are not as exceptional in childhood as they have heretofore been considered. The manifestations of stone are more clean-cut and evident in children than in adults, the diagnosis can be made more readily and the surgical treatment is simple and effectual. The salivary duct should be probed in every instance of enlargement of a salivary gland in a child when a definite cause for the enlargement cannot be ascertained.

There is a hitherto undescribed form of sialodochitis of Stenson's duct in children, secondary to inflammation of unknown origin, leading to enlargement of the parotid gland that can be readily mistaken for sarcoma or mixed tumor. The gland is considerably increased in size, firm, nodular and adherent; the orifice and buccal end of the duct are embedded in stenosing cicatricial tissue. There is a tendency to repeated occurrences of the parotid swelling after slitting the mouth of the duct, but cure follows promptly the excision of the diseased end of the duct.

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OBSERVATIONS IN FORTY-TWO CASES OF PERFORATED GASTRIC AND DUODENAL ULCER.*

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Of the forty-two cases of gastric and duodenal perforation reported herewith, thirty-nine were observed at the Harlem Hospital and three in private practice. Of the thirty-nine, only two were recorded as occurring before 1910, which would suggest that previous to that year the condition not infrequently escaped recognition, or that the hospital records were faultily kept. In none of the cases did the operator feel that a differentiation between gastric and duodenal ulcer before the operation was justifiable. Indeed, I am inclined to the belief that this differentiation is more likely to be the result of good luck than of good judgment.

PLACE OF RUPTURE

Most observers agree that the anterior wall of the stomach and duodenum is particularly prone to perforation, and in this series all were on the anterior wall. Moynihan reports fifteen anterior in seventeen perforation cases; Patterson, ninety-seven anterior in 112 cases; Hawkins, fifty-seven anterior in seventy-three cases.

There may be several perforations at the same time, as reported by Faura, Dirriot, and Appert, who record two cases in which there was one perforation on the anterior wall and one upon the posterior wall, occurring at the same time.

Musser says that 28.1 per cent. of all ulcers perforate. Considering the large number of healed ulcers accidentally discovered at autopsy, that never gave any symptoms, and taking into account the number of cases that heal spontaneously while under competent observation, and including my own experience, Musser's statement appears to fix the percentage of perforations much too high.

Perforation may occur at any age. Cheyne reports a case in a boy of thirteen; Marsten, in a girl of six; Bisset reports a case of gastric perforation in a child forty-five hours old. Keen and Musser report a case of perforation in a man of seventy. At the operation the process was regarded as malignant, but microscopic examination proved it to be ulcer.

In my own cases, 22 were between the ages of twenty and thirty; 1 aged nineteen; 13 between the ages of thirty and forty; 3 between the ages of forty and fifty; 2 between the ages of fifty and sixty; and 1 at sixty-eight.

There was but one case in which more than one perforation was found—Case No. 41, in which two perforations were found about half an inch apart on the anterior wall of the stomach.

PERITONITIS.

The type of peritonitis depends largely upon the stomach contents. If the perforation occurs when the stomach is empty, there will be few living organisms in the peritoneal sac, the highly acid gastric juice inhibiting bacterial growth. There may be considerable fluid in the abdominal cavity, but this is not always derived from the stomach; in some cases it is the result of the inflammation. It is variously sticky, turbid, yellow, or brown in color, and may be alkaline or neutral in reaction.

Even though the gastric contents have been distributed throughout the peritoneal cavity, the resulting peritonitis is not necessarily extensive.

Didgeon and Sargent in their work, "The Bacteriology of Peritonitis," published in 1905, explain why the peritonitis resulting from perforation of a gastric ulcer tends to be so limited and mild in character. Before the appearance of this work, very little was known about the bacteriology of this condition. Several observers claimed to show that the pneumococcus played an important rôle Streptococci and staphlococci have been regarded as causative factors.

Didgeon and Sargent examined nine cases and in each instance isolated a strepto-diplococcus from the edge of the ulcer; in four of them the organism was found in the exudate in the peritoneum. The same organism was obtained from the pleural sac and from two local abscesses in connection with the stomach. They found that the strepto-diplococcus had very low pathogenic properties. For example, they never succeeded in killing guinea-pigs or mice with it. The animals were ill, but always recovered and never showed any post-mortem lesions, whether inoculated subcutaneously or intraperitoneally. These observers regarded the organism as distinct from the streptococcus pyogenes and the pneumococcus. In the only case in which the peritonitis was at all marked, with extensive intestinal distention, the colon bacillus was found in association with the strepto-diplococcus, and this was the only case which died of diffuse peritonitis.

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*Read before the Waterbury Medical Society, December 14, 1915.

These experiments tend to show that whether the same organism is concerned in producing the peritonitis in all cases or not, it is usually one of low virulence, and that the majority of cases of gastric perforation, if operated upon sufficiently early, should recover.

When virulent peritonitis occurs, which is sometimes the case, some organism like the colon bacillus is responsible for its onset. Perforation of the stomach or duodenum is a grave condition, and a fatal outcome occurs in almost every instance unless operative relief is afforded. I firmly believe that the only cases of perforation of the stomach which recover without operation are those of the posterior wall, which give rise to only a localized peritonitis in the lesser sac, and in which extension into the general peritoneal cavity is obviated by obliteration of the foramen of Winslow—a common occurrence in gastric or duodenal ulcers, the foramen being obliterated by protective ulcers.

DIAGNOSIS.

The differential diagnosis of acute abdominal lesions is a very difficult clinical problem, skill in which can only be obtained by long experience.

PREVIOUS HISTORY

In many cases one may elicit a history of previous disturbances of digestion—pain, nausea, and the additional vague symptomatology which usually obtain in this class of cases. However, in my forty-two cases, twelve did not give a history of digestive disturbances, making it evident that the absence of previous faulty digestion need not be regarded as a determining diagnostic factor.

SEX.

In this series there were six females and thirty-six males. Five of the females were operated upon for gastric and one for duodenal perforation. This is not in accordance with the statistics of English writers, who claim gastric perforation is more common in females. It is, however, in keeping with most of the American reports. Thus, Peck published in the *Annals of Surgery* thirteen gastric perforations—nine in males and four in females—and seventeen duodenal, all in males.

PAIN.

This is the most constant of all symptoms—always severe, knife-like in character, and, as a rule, early in the attack located in the epigastrium. I have never seen a patient with more agonizing pain than we find in perforation, if seen early. Respiration is very painful, causing a subsidence entirely of any abdominal effort. The thighs are flexed upon the abdomen, so as to relieve as much tension as possible, and the patient will make every effort to lie perfectly still.

NAUSEA.

At the Harlem Hospital we found this symptom in every case and in some it was marked.

VOMITING.

Vomiting is a common but not always a prominent symptom. In this series of forty-two cases, it was entirely absent in twelve. In these twelve, eight were gastric and four duodenal perforations.

The character as well as the quantity of the vomitus depends upon how soon after a meal the perforation occurs. If soon after a meal, the vomitus will contain particles of food. On the other hand, if the perforation occurs when the stomach is empty, the vomitus will consist principally of bile and mucus. Blood is rarely seen in cases of perforation.

Vomiting is more commonly observed in duodenal than in gastric perforation, which accords with observations in this series, for we had only one case of duodenal perforation in which there was no vomiting. This is explained by the fact that the gastric content in gastric perforation is more easily forced out through the opening into the peritoneum than up through the esophagus, while in duodenal perforation, the stomach wall being intact, the mechanical act of vomiting is not interfered with.

SHOCK.

In these cases shock was not observed, and in my opinion this symptom is of very little importance. If there be any shock, let it not act as a contraindication for immediate operation, and, under no circumstances, defer the operation until the shock has subsided, for this is one condition in which the usual argument in this connection does not hold good—every hour of delay much increases the mortality.

LIVER DULLNESS.

The presence or absence of liver dullness has been a very uncertain sign in my experience, and in a great measure it depends upon the amount of gas that escapes from the perforated viscus into the peritoneal cavity.

MUSCULAR RESISTANCE.

Too much cannot be said of this one constant sign. It is indeed what may easily be termed pathognomonic. In the cases of perforation which I have seen it was present to such a marked degree that there was no mistaking it. If one but sees a single case of perforation of this class and feels the abdomen, he ought to make no mistake in the diagnosis thereafter. We speak of muscular rigidity in other conditions, but there is nothing like the rigidity accompanying gastric and duodenal perforation.

Dullness of the flank has been spoken of as a symptom of value, but in these cases it has not been sufficiently marked to be of value in diagnosis.

I have not derived any aid from auscultation.

DIFFERENTIAL DIAGNOSIS.

Gastric or duodenal perforation is confused with acute appendicitis, and indeed two of these cases were sent to the hospital with the latter diagnosis. In both of these conditions one will get a history of some previous gastric disturbance. In both the onset is marked by pain, but it is differently situated; in appendicitis the pain is usually confined to the umbilicus, later shifting to the right lower quadrant of the abdomen; in perforation the pain is always in the epigastrium. Vomiting is common in both. In appendicitis there are elevation of temperature and acceleration of pulse rate, which are not found in perforation. In appendicitis the rigidity never assumes the board-like character found in perforation. If there is rigidity in appendicitis, it is found in the lower right quadrant of the abdomen.

With the beginning of general peritonitis, as occurs in both conditions if not operated upon, the differential diagnosis becomes more difficult, and when the case has reached this stage there is no doubt that the only thing to do is to operate. If the diagnosis is appendicitis, and we approach the appendix with the usual incision, and find it normal or nearly so, it is a matter of little difficulty to enlarge the incision to enable us to observe the organs in the right upper quadrant. If we find the cause of the condition, we can use the lower incision for drainage.

When the abdomen is open, the character of the abdominal contents should be a clue to the diagnosis. In perforation the fluid is usually of a light straw color with no odor, while in appendicitis we find either it serous or sero-sanguinous.

Acute cholecystitis may be mistaken for perforation. In these cases the pain is as severe as in perforation, but is usually most marked toward the right side, while in gastric perforation the pain is always closer to the midline, and the rigidity is much more marked and diffuse than in cholecystitis.

The most difficult condition to differentiate from gastric or duodenal perforation is pancreatitis, and when we consider the location of the pancreas, we can readily see why such is the case. The location of the pain may be the same and as severe in one condition as in the other, but the rigidity is not so marked in pancreatitis. Vomiting in acute pancreatitis is always more marked and is of that dark brownish material which should always put us on our guard. If the abdomen is open in pancreatitis, we find, as a rule, a larger amount of fluid, which is dark brown in color, in contrast to the fluid found in perforation. In acute pancreatitis, the patient has a bluish-gray appearance.

Mesenteric thrombosis and acute intestinal obstruction are conditions that may be mistaken for perforation. Fortunately, the former is a rare condition. Acute intestinal obstruction should be easily differentiated by the pain, which is intermittent in character, the absence of rigidity, the history of previous causes for peritoneal adhesions, etc., and the character of the vomitus.

We should content ourselves with this thought: Every case in the classes here mentioned calls for immediate operation. Thus, the diagnosis will be rapidly made and all possible help will be given. Delay in these conditions greatly jeopardizes the chances for recovery.

I do not think it is necessary in this paper to go into the differential diagnosis of such conditions as vesical, ureteral, or renal calculus, ruptured ectopic gestation, or acute pyosalpinx.

To sum up the whole question of differential diagnosis, all we have to do is to think of the pain and, above all, the board-like rigidity, for in these two symptoms we have our greatest help in arriving at the correct conclusion.

TREATMENT.

There is but one treatment for perforation, and that is immediate operation. When the abdomen is open, the question arises whether we are to excise the perforated tissue or close the hole by suture. In most cases we find a very small perforation and I can see no justification in resection. The Balfour method of cauterization I have never used.

In but one of these cases (No. 11 in the series) was there a perforation which I could not close. In this case the perforation had occurred three days before admission to the hospital. There was a hole in the duodenum large enough to admit two fingers. The condition of this patient was such that all I could do was to pack. He died in two hours.

I have never used any of the adjacent organs to close a perforation. Downs reports a case where he closed the perforation by the use of the gallbladder. In all of my cases, except the one mentioned, I have closed the perforation by suture, and in some instances the perforation was of sufficient size to admit the tip of my finger.

After closing the perforation, it has been my custom to cover the line of suture with a flap of omentum, and I have not seen a case where this has sloughed or given any trouble.

In many of my cases I worried as to the patency of the pylorus after closing the opening. It seemed to me that it was impossible for anything to pass through, but, much to my gratification, this did not give rise to any difficulties. In only two of my cases (No. 6 and No. 28 in the series) was it necessary to reoperate to relieve symptoms of obstruction.

In case No. 6 there was a large perforation of the duodenum, which was closed by suture. For about one month after the operation he seemed to progress very well; at the end of the second month his pain and vomiting returned, and he submitted to a second operation to relieve the obstruction. At the second operation, three months after closing the perforation, we were surprised to find no sign of a previous operation, but the pylorus was very much thickened, and it was impossible to pass a small artery clamp through it after opening the stomach. A posterior gastro-enterostomy, without clamps, was made, which was followed by an uneventful recovery. When last seen the patient was in perfect health with no sign of gastric disturbance.

In case No. 28 there was a gastric perforation of medium size; some trouble was expreienced in securing sufficient tissue around the perforation to hold the sutures. More than one inch of the contiguous tissue was used, and as the operation was just on the proximal side of the pylorus, I feared that it had been entirely obliterated. In this case I felt that a gastro-enterostomy was indicated, but the man's condition prohibited the procedure at that time. The immediate conduct of the case seemed favorable until the administration of soups and broths, about nine days after the operation, when persistent vomiting occurred. A second operation seemed indicated, but the abdominal wall had become infected where the drains were inserted, and we deemed it best to allow this to clear up before operating. For four weeks this patient suffered a great deal of pain and lost ground rapidly from lack of nourishment. Rectal feeding seemed to be of no avail, so, in spite of the pus-covered abdominal wall, a posterior gastro-enterostomy, without clamps, was done, and the patient made an uneventful recovery. Six weeks elapsed before the wounds entirely closed.

After closing the perforation, the entire abdomen should be cleaned as far as possible of the escaped contents of either the stomach or duodenum. This can be done by sponging with moist gauze. Irrigation of the abdomen should be done, in my opinion, only where there are signs of peritonitis.

Drainage of the abdomen is the next most important question. Some writers say that if operation is performed within eight or ten hours, there is no need of drainage. With this I cannot agree. I think that every case, no matter how soon operated upon, should be drained. In my cases I have always inserted a drain at the site of the perforation and one, or sometimes two, at the lower part of the abdomen—one in the region of the cecum and the other above the symphysis.

One of my cases was not drained. At the operation there was very little fluid in the peritoneal cavity, the perforation (gastric) having occurred only three hours before. The patient died. I feel that had drainage been employed a more fortunate outcome might have been obtained. Since then I have drained in all instances. I am not prone to the use of drainage—on the contrary, complete closure after abdominal section is all but a routine practice with me. But in gastric and duodenal perforation, drainage should invariably be used.

Drainage of the subphrenic spaces is very important and should always be considered, particularly in cases operated upon twelve or more hours after perforation has occurred. In my cases I have had no experience with the drainage of the subphrenic spaces, but I think that many of those supposed to have died from post-operative lung condition developed subphrenic abscesses which were not recognized.

Pneumonia is, however, one of the most serious post-operative complications, and is frequently the cause of death. Elliot cites Federman as attributing three out of a total of seven deaths to this cause. In Brummer's tabulated list of 470 cases, there were 280 deaths, seventeen from this complication. Petran reports six fatalities out of sixty-nine due to this cause.

A vital question is that of immediate gastro-enterostomy, and a very debatable one that must be heard from both sides. It is needless to take up space with all the arguments *pro* and *con*. The reader is referred to the article published by Elliot in *Annals of Surgery*, May, 1912, which contains expressions of opinion from the leading surgeons throughout the world. Among my colleagues at the Harlem Hospital there is an equal division of opinion. I am still of the opinion that gastro-enterostomy is not a necessary factor in the successful outcome of the surgical relief of gastric and duodenal perforation.

In nearly all of my cases I felt that I had to a great extent caused (by the suturing of the perforations which were close to the pylorus) a marked constriction of this opening, and, yet, as I have already stated, in only two cases was a secondary operation necessary. There can be no question that the additional operation adds considerably to shock, and surely all will agree that the condition with which we are dealing is one that calls for the utmost care and speed. It is easy enough to say that gastro-enterostomy adds only a few minutes to the length of the operation, but, in my opinion, only one who has had great experience is in a position to accomplish the desired result in a short period of time. As to the added drainage which gastro-enterostomy affords the stomach, allowing more secure closure of the sutured perforation, it is proper to state that the patients are rarely allowed anything by mouth for from twelve to twenty-four hours, and by this time nature has made adequate repair at the line of suture and the perforation is leak-proof.

Then we come to the cure of the ulcer and the prevention of another forming. This would lead us into a lengthy debate, and I must say that this question stands today where it was years ago. I do not believe that gastro-enterostomy adds to the cure of ulcer, or prevents the formation of another one. We learn from the surgical laboratories of our large hospitals and colleges what gastro-enterostomy does while the pylorus is patent. I believe that in perforation we should get into the abdomen, close the opening, and get out with as much speed as care will permit, even with the risk of having to do a second operation, for if this becomes necessary, we will have a patient better able to withstand it.

Age	Name	Location of Ulcer	History of Gastric Trouble	Symptoms	Operation	Result
3	J. W.	Gastric	Negative	Ill 4 days before operation	Exploratory laparotomy	Died
25	K. B.	Gastric	Had 3 years	Ill 24 hours; pain, nausea, vomiting none	Perforation closed	Died
34	B. W.	Gastric	Had 8 years	Ill 2½ hours; pain, nausea, vomiting	Perforation closed	Cured
26	T. C.	Gastric	Negative	Ill 8 hours; pain, nausea, vomiting	Perforation closed	Died
28	L. S.	Gastric	Had 2 years	Ill 7 hours; pain, nausea, vomiting	Perforation closed	Cured
32	R. E.	Duodenal	Had 2 years	Ill 4 hours; pain, nausea	Perforation closed	Cured
34	M. S.	Duodenal	Had 2 years	Ill 3 hours; pain, nausea	Gastro-enterostomy	Cured
29	D. B.	Gastric	Negative	Ill 1 hour; pain, nausea	Perforation closed	Died
3	M. S.	Gastric	Had 3 years	Ill 6 hours; pain, nausea, vomiting	Perforation closed	Cured
28	R. M.	Gastric	Had 5 years	Ill 48 hours; pain, nausea, vomiting	Perforation closed	Died
5	M. McH.	Duodenal	Had 2 years	Pain, nausea, vomiting	Perforation closed	Died
35	J. K.	Gastric	Had 1 year	Ill 4 hours, pain, nausea, vomiting	Perforation closed	Cured
29	S. S.	Duodenal	Had 2 years	Ill 6 hours; pain, nausea, vomiting	Perforation closed	Cured
31	A. McL.	Gastric	Had 1 year	Ill 4 hours, pain, nausea, vomiting	Perforation closed	Died
32	W. J.	Gastric	Had 2 years	Ill 3 hours; pain, nausea, vomiting	Perforation closed	Cured
25	P. McC.	Duodenal	Had 1 year	Ill 4 hours; pain, nausea, vomiting	Perforation closed	Cured
23	A. R.	Duodenal	Negative	Ill 6 hours; pain, nausea vomiting	Perforation closed	Died
28	J. A.	Duodenal	Had 2 years	Ill 3 hours; pain, nausea, vomiting	Perforation closed	Cured
29	E. G.	Gastric	Had 2 years	Ill 6 hours; pain, nausea	Perforation closed	Cured
33	J. McD.	Duodenal	Negative	Ill 3 hours; pain, nausea, vomiting	Perforation closed	Cured
24	H. F.	Duodenal	Had 2 years	Ill 4 hours, pain, nausea, vomiting	Ulcer closed	Died
25	C. M.	Gastric		Ill 3 hours; pain, nausea, vomiting	Gastro-enterostomy	Died
25	J. F.	Gastric	Had 2 years	Ill ½ hour; pain, nausea, vomiting	Perforation closed	Died
28	M. R.	Gastric	Negative	Ill 3½ hours; pain, vomiting, shock	Perforation closed	Cured
30	H. C.	Gastric	Negative	Ill 4 hours; pain, nausea, vomiting	Perforation closed	Cured
23	R. W.	Gastric	4 or 5 months	Ill 6 hours; pain, nausea, vomiting	Perforation closed	Cured
34	T. McS.	Gastric	Had 2 years	Ill ¼ hour; pain, nausea, vomiting	Perforation closed gastro enterostomy	Cured
37	H. K.	Gastric	Negligible	Gastritis	Perforation closed	Cured
42	F. M.	Duodenal	1 year	Pain, nausea, vomiting	Exploratory laparotomy	Died
29	G. W.	Gastric	Negative	Ill 4 hours; pain, nausea, vomiting	Perforation closed	Cured
33	O. S.	Gastric	Negative	Ill 6 hours, pain, nausea, vomiting	Perforation closed	Cured
20	C. W.	Gastric	Negative	3 days prior was struck by edge of tray against abdomen; vomited day of admission	Ulcer sutured	Cured
4	E. G.	Gastric	Negative	Ill 24 hours; pain, vomiting	Ulcer closed	Died
36	J. D.	Gastric	Had 4 years	Ill 6 hours; pain, vomiting	Ulcer closed, then gastro enterostomy was performed one month later	Cured
35	S. M.	Gastric	Had 2 years	Gastric distress 4 days previous; ill 4 hours day of admission; nausea, vomiting	Ulcer closed, gastro-enterostomy performed	Cured
56	F. M.	Gastric	Had 8 years	Ill 8 hours; pain, nausea, vomiting		Died
19	W. Y.	Gastric	No previous gastric history	Ill 1 hour; pain, nausea, vomiting	Ulcer sutured	Cured
35	E. A.	Gastric	Had 2 years	Ill 14 hours; pain, nausea, vomiting	Ulcer sutured	Cured
28	T. P.	Gastric	Had 30 years	Ill 8 hours, pain, nausea, vomiting	Ulcer sutured	Cured
27	V. J.	Gastric	Negative	Ill 4 hours; pain, nausea, vomiting	Ulcer sutured	Cured
29	E. C.	Gastric	Had 2 years	Ill 16 hours; pain, nausea, vomiting	Perforation closed	Cured
42	L. S.	Gastric	No previous gastric history	Pain, nausea, no vomiting	Perforation closed	Cured

COMPLICATIONS.

The most feared complication is subphrenic abscess. I have spoken of this above. Peritonitis is also a complication against which we have to guard. If drainage is employed, we have done all we can to prevent its occurrence.

AFTER-TREATMENT.

Our patients are always sat upright in bed after they have recovered sufficiently from the anesthetic. We have always found that patients will drain much better in this position. Nothing is given by mouth for the first twelve hours; after that the patient is allowed to chew cracked ice. Brushing the teeth and washing the mouth is always helpful. Small amounts of tap water and whiskey by the rectum, such as a half ounce of whiskey and six ounces of tap water every two hours, are much better than amounts at greater intervals, and more apt to be retained. If the rectum does not retain the fluid, it is given by hypodermatoclysis, a measure I find very useful. Fluids must be administered in some way. After twenty-four hours, if there is no vomiting, small amounts of fluid are given by mouth and gradually increased.

The frequent use of the stomach pump has been a very helpful factor in these cases. We should never be afraid to use it. I have never seen harm from its use and I am sure many cases have been relieved from the annoying and distressing vomiting which frequently follows operation.

The time drainage should be continued will have to be governed by the quality and quantity of discharge, but it must be remembered that in this condition we can allow a drain to remain in place too long. It has been my habit to dress the wound daily, and to remove the drain as soon as possible.

In all cases, except Case No. 38, the drainage was entirely removed within one week. The exception was a man 35 years of age, who had been suffering from gastric disturbances for twelve years, and whose perforation had occurred eighteen hours before admission to the hospital. He had tuberculosis of both lungs. At operation we found his abdomen almost filled with a greenish, foul-smelling fluid, containing food particles which had a typical colon bacilli odor. I never saw so much fluid in an abdomen before. The culture from the fluid showed the presence of staphylococci, streptococci, and colon bacilli. His perforation was large enough to admit my thumb, and it was with a great deal of difficulty that suturing was accomplished. For forty-eight hours the patient seemed all right; then he developed a gastric fistula, the discharge from which seemed to digest his abdominal wall, but this fistula closed after a stormy convalescence. I saw this patient a week ago and found him in fine physical condition, having gained fourteen pounds in weight.

SUMMARY OF CASES.

In 30 per cent. of the cases there was no history of gastric disturbance prior to the perforation.

In 1 per cent. of the cases vomiting was not present.

In every case nausea, pain, and board-like rigidity of the abdomen were present.

In 72 per cent. of the cases the ulcer was closed by suture.

In these cases 70 per cent. were cured—30 per cent. mortality.

In 28 per cent. of the cases gastro-enterostomy was performed. Of these 33 1/3 per cent. were cured and 66 2/3 per cent. died.

The mortality in cases operated upon more than eight hours after rupture was 66 2/3 per cent.

The mortality in cases operated upon before six hours was 20 per cent.

I am deeply grateful to the members of the surgical staff of Harlem Hospital for allowing me to report these cases, particularly to Dr. Haubold, on whose service most of these cases occurred and through whose courtesy I was allowed to operate.

A CLINICAL LECTURE ON VOLVULUS.

(Delivered at St. Bartholomew's Hospital Wednesday, April 26, 1916.)

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Introduction. Volvulus is a twisting of the intestine upon its long axis until there is sufficient interference with the blood supply to cause strangulation unless relief is afforded. The exact mechanism of its production is unknown, but the two necessary factors are, first, a congenital or acquired defect in the intestinal attachment allowing of a free mobility and, second, a condition producing an artificial pedicle.

Case I. The patient was an unmarried woman, aged 57, a teacher by profession, who was admitted into St. Bartholomew's Hospital on March 2, 1916, complaining of abdominal pain. She said that after getting into bed at 9.30 on the evening of March 1st she had been seized with a sudden attack of pain which extended across the hypogastric region. The pain was accompanied by retching and she soon began to vomit a brown fluid, the vomiting continuing until seven o'clock the next morning. Her bowels had been relieved naturally in the afternoon of March 1st: during the night she had passed much flatus after four enemata of soap and water.

At 9.30 A. M. on March 2d she was sent to London by motor car, a journey of 25 miles. When I saw her at 2 P. M. she looked ill, was complaining of stomach-ache; had a temperature of 99.8° F.

and a pulse of 110. The abdomen was greatly distended, but not uniformly, for the distention was on the right side below the level of the umbilicus than at other parts. The abdominal walls were not very tense and the swelling on the right side had a well-defined smooth upper border which suggested the presence of an ovarian cyst. Percussion, however, showed that the swelling was resonant. Half an hour later the patient was operated upon under a general anesthetic. An incision was made to the right of the middle line through the fibers of the rectus abdominis and a considerable quantity of blood-stained fluid escaped as soon as the peritoneum was incised. The tumor was found to be a greatly distended loop of large intestine. It was turned out of the abdominal cavity and was then seen to be the cecum anchored at its free end by the adhesion of an inflamed vermiform appendix to the pelvic structures and rotated upon itself at the ascending colon. The appendix was freed, the meso-appendix tied and the appendix removed. A grooved director was passed into the cecum through the opening left by the removal of the appendix and the cecum was emptied of its fluid contents and flatus. It was then easy to untwist the colon by rotating the cecum through two complete turns from left to right. The director was removed and the stump of the appendix closed after being disinfected in the usual manner. It was noticed that the cecum had been so greatly distended that its serous coat had cracked in several places and that it lay as a flaccid and inert mass after it had been emptied. One cc. of pituitrin (solution of the infundibular extract) was given hypodermatically before the patient left the operating table in the hope of increasing the peristalsis of the intestine and the injection was repeated three times at intervals of an hour. The patient passed a fairly good night, although the abdomen was still much distended, and on the day after the operation hypodermatic injection of one one-hundredth of a grain of eserine combined with eight minims of liq. strychnine hydrochlor. were administered. The abdominal distension remained but without rigidity for ten days, by which time it had disappeared, and the bowels, which had acted only after an enema, operated naturally. The patient made a good recovery and was discharged from the hospital on March 27th. I am indebted for these notes to my dresser, Mr. H. B. Jackson.

Case II. Henry D., aged 3 days; was admitted into St. Bartholomew's Hospital under my care March 2d, 1916, suffering from intestinal obstruction. On admission the infant was vomiting meconium; its abdomen was greatly distended and it seemed to be in pain. Examination showed that the anus was well-formed, but on passing a director into the rectum it was thought to be arrested an inch and a quarter from the anus. A diagnosis was made of imperforate rectum. Under a general anesthetic the rectum was explored through a median perineal incision. No feces escaped and the child was turned on its back and the abdominal cavity was opened by an incision in the left iliac region. The descending colon was found to be empty and contracted but the small intestine was greatly dilated. The small intestine above the dilated portion was secured to the edges of the wound and was opened. The combined operation took only a few minutes and the infant subsequently showed no signs of shock. The enterostomy acted satisfactorily, but there was much vomiting, food was taken badly and death occurred on March 10th, eight days after admission and eleven days after birth. The post-mortem examination of the abdominal viscera showed that the stomach was dilated, the pylorus was normal and the upper two feet of the small intestine were natural. An enterostomy had been performed 2½ feet from the duodeno-jejunal flexure, the bowel being here considerably dilated. A short distance below the enterostomy the bowel suddenly became contracted without any evident local cause of obstruction, but all the small intestine below this—about three feet—was twisted several times in a clock-wise direction around the mesentery and was very contracted. The large intestine was also contracted, but was otherwise normal. The rectum and anal canal—apart from their having been incised by a perineal wound—were normal.

I am indebted for these notes to Mr. Cameron, the dresser of the case.

Case III. I find two other cases of volvulus occurring in newly-born children. The first is recorded by Mr. W. Harrison Cripps*. A child was admitted into St. Bartholomew's Hospital under the care of Mr. Alfred Willett on the third day after birth suffering from obstinate vomiting and having had no passage of fecal matter by the anus. The abdomen was moderately distended. The little finger could be introduced only a short distance within the anus, which appeared to end in a cul-de-sac. As the infant was thought to be suffering from an imperforate rectum Littré's operation of colostomy in the left groin was performed, the portion of intestine that presented itself being opened and stitched to the wound. Death occurred from peritonitis on the third day.

The autopsy showed that the rectum, the whole length of the colon and a couple of feet of the ileum were perfectly normal, though firmly contracted into a muscular cord no thicker than a pipe-stem. Above the spot mentioned the small intestines were greatly distended. The distended portion of the bowel ended abruptly by a loop making a complete twist upon itself, the loop being folded over in such a way as to cause complete obstruction to the lumen. The displacement was remedied at once by untwisting the loop. Pressure on the upper part of the distended intestine immediately caused the contents to pass into the previously empty portion of the bowel. The undilated portion of the bowel below the seat of obstruction was much smaller than it should have been at the full period of fetal life, a condition probably accounted for by the absence of all meconium from its interior, which should have stimulated its growth.

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* Trans. Pathological Society of London, Vol. 31, 18[illegible], p. 111 and The Lancet, 18[illegible], vol. I, p. [illegible])

Case IV. In 1891 Dr. Newton Pitt* showed a case of volvulus in a new-born infant, saying that a new-born child was admitted into Guy's Hospital under the care of Mr. Clement Lucas. The infant was unable to have any movements and had a distended abdomen. As the rectum was thought to be imperforate, an incision was made in the left iliac region and a distended coil of intestine was sutured to the abdominal wall and opened. The child died two days after its birth.

At the post-mortem examination the abdomen was found filled with distended coils of intensely engorged ileum. The colon and rectum were normal, empty and patent. The ileum for two feet above the cecum was healthy and empty. Above this, but with no very sharp line of demarcation from the healthy bowel—such as existed from the upper limit—there commenced a condition of intense engorgement and inflammation. For the next three feet the bowel was almost black from strangulation and engorgement with blood, which had led to thickening of the wall; this area was also the most distended portion of the bowel. At the upper limit there was a sharp line above which the bowel was free from any engorgement or distension, and there was no sign of any linear ulceration or marking such as would probably have been present if the bowel had been constricted by a band. The mesentery presented no abnormality as to length.

A careful search failed to reveal any band or adhesion. There was some lymph on the peritoneal surface of the strangulated bowel: elsewhere the peritoneum was normal.

There were no evidences of any intussusception. The portion of bowel which had been attached to the left inguinal region was part of the strangled bowel: the spot opened was three feet from the cecum and was less engorged than some of the bowel above it. The remaining viscera were normal. The colon was empty and contracted, while a volvulus of the ileum had formed.

Case V. The following case is quoted by Keating† in his Cyclopedia of the Diseases of Children as volvulus in a child: A child aged three years had suffered from intestinal obstruction for four or five days before medical assistance was sought. All the food taken had been vomited and the vomit had become stercoraceous. When the child was seen the face was anxious and rather pinched. The abdomen was distended and slightly tympanitic; there was no jaundice or hepatic enlargement, no evidence of tumor nor any sign, upon examination of the rectum, of intussusception of the bowel. There was much rumbling and gurgling to be felt and heard. The temperature was 100° F. An effort was made to inject some water into the rectum, but after an ounce or two had been injected no fair force would procure the admission of more. The parents stated that some years before the child next in years to the present patient had died with somewhat similar symptoms. A post-mortem examination had been made and the cause of death discovered, but as the doctor had moved, it was impossible to obtain further information. An operation undertaken on the evening of the day the child was first seen showed the abdominal viscera were normal except at the sigmoid flexure. The bowel in this part of its course was found to be lying out of its plane, thickened and deepened in color, with a long mesentery upon which, and with which, it was doubled. The distended bowel emptied itself with a gurgle as soon as it was lifted up and the abdomen was closed. Little or no effusion was found in the peritoneal cavity. The child died eight hours later.

Remarks. You will learn two facts from these cases. The first is already known, that volvulus is one of the causes of acute intestinal obstruction, in which operation is likely to be postponed because its course is not violent, although its onset is sudden; the second fact, of which you were probably as ignorant as I was myself, is that volvulus may occur in new-born children. I hope, however, that you will think of volvulus in children solely as a pathological curiosity. Volvulus is one of the commoner causes of acute intestinal obstruction in adults; it is rare in old people; it is rarer still in children; it is rarest of all in infants.

Pathology. Volvulus requires for its production a loop of bowel lying less securely packed than usual in the abdominal cavity; a loaded bowel and irregular peristalsis. The result is a twist of at least one turn, more frequently of a turn and a half or two turns of the loop upon itself much in the same way that acute torsion of the testis takes place spontaneously, often in the mesorchium, less commonly in the spermatic cord. In volvulus it is usual, but by no means necessary, that the mesentery should be unduly long. Dependence and loading of the loop of bowel are important factors in the production of volvulus which occurs therefore in adults at the cecum or sigmoid and in the new-born at the jejunum or ileum. If the twist in the long axis of the loop is less than a turn and a half, I believe that the bowel has the power of untwisting itself, for in two or three cases the patient has complained of similar symptoms, but of less intensity, before the attack which needed an operation for its relief.

Symptoms. The onset of volvulus is sudden and painful and occurs in persons who have had reason to believe that they were in their ordinary health. It may occur without any known cause, as in case I, where the patient had gone to bed, or it may follow some injury to the abdomen. As a result of the shock given to the intestinal musculature there may be an involuntary emptying of the bowel below the seat of the volvulus. The pain is persistent or is

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(* Trans. Pathological Society of London. Volume 42, 1891, p. 123.)

(† The reference is incorrectly given. It should be The British Medical Journal, 1887. Vol. ii, p. 829.)

characterized by exacerbations. It is of the nature of a stomach-ache and is not often so severe as to lead the patient to call immediately for medical assistance. It usually happens, therefore, that the patient has been ill for at least some hours before he is visited. The position of the volvulus determines the time of the appearance of the signs of intestinal obstruction. If the sigmoid is involved the signs appear early; when the cecum is twisted they may be delayed until the large intestine has emptied itself or they may be masked by the discharge of flatus generated in the great bowel. The onset of vomiting may be delayed or in some cases may even be entirely absent, but it is usually a marked feature of the condition. When the initial shock has passed off and in spite of the pain the patient does not suffer from any great degree of shock and neither the pulse nor the temperature is much altered.

Signs. Examination of the abdomen within a few hours of the onset of symptoms will give a clue to the cause of the obstruction because volvulus is always attended with abdominal distension and at first this distension is limited to the portion of bowel involved. In the early stages there is no inflammation of the parietal peritoneum and the abdominal walls are not rigid. The abdominal distension appears therefore to be, as it really is, limited to the affected region and the distended portion of gut can be felt through the abdominal walls. Later in the course of the disease when the whole bowel has become paralyzed this important diagnostic sign is lost, for the abdomen becomes uniformly distended. Local tenderness over the actual seat of the volvulus is present, but is not usually very marked until the onset of peritonitis.

Diagnosis. You will have no difficulty in recognizing the case as one of so-called "acute abdomen" if you do not mistake it for cramp or colic and you will probably be able to go farther than this at once and look upon the condition as one with which you are not familiar. The patient is suffering from intestinal obstruction which has lasted for some hours at least before you were consulted. Examine first for a strangulated hernia, since this is the most common cause of acute obstruction and can be excluded at once.

The facial aspect tells you that the condition is not one of acute perforation of the stomach or duodenum and this is confirmed by the comparative mobility of the abdominal walls and the absence of the rigidity which is characteristic of perforation.

Biliary colic and renal colic pass through your mind only to be excluded after a short physical examination.

The rarer conditions leading to acute obstruction may then be considered. Strangulation by a band usually has a slower onset, and the symptoms are less acute in the earlier stages and meteorism is not so well marked.

In acute hemorrhagic pancreatitis the patient is more apathetic; he is very fat; there is a history of potus; the pain is felt in the epigastric and lumbar regions. The urine should be examined to determine whether it shows an increased diastatic activity.

Thrombosis and embolism of the mesenteric vessels most closely resemble volvulus and except by abdominal exploration I do not know how a diagnosis can be made. The patient is seized with sudden abdominal pain; there is perhaps rather more collapse and there is an absence of the localized abdominal swelling which is so common a feature of volvulus in its earlier stage.

Appendicitis, even in its most acute onset, should not enter your thoughts when you are examining a case of volvulus. The signs and symptoms are widely different.

Prognosis. The prognosis at the present time is extremely unfavorable, but I hope that you will live to improve it, just as we, in our generation, have improved the prognosis of intussusception. The improvement rests entirely with yourselves, for it depends upon early recognition and upon early recognition depends the success of operative treatment. If you are contented with a diagnosis of stomach-ache, colic or cramp, give a purgative, or worse still, opium, and then wait awhile before you send for the surgeon, your patient will almost certainly die and his blood is on your head. If you recognize the case as one of acute intestinal obstruction and insist upon immediate operation, some of your cases will recover. Insistence upon your part will be necessary to overcome the natural repugnance of the friends to sanction an operation for a condition that does not appear to them to be very urgent and from which they will very properly urge the patient has recovered on previous occasions.

Statistics. You must, however, point out that the mortality is appalling. I have been over the records of our hospital from 1899 to 1915. During that time 25 cases of volvulus were admitted—14 men and 11 women. Twenty-one of these patients died, and one recovered. The statistics from St. Thomas' Hospital* are more favorable, but it should be remembered that they deal only with volvulus of the cecum, whilst in our cases there are several instances of volvulus of the small intestine—a still more deadly condition. Corner and Sargent state that "of 57 cases of volvulus of the cecum 19 were operated upon and recovered, whilst the other 38 died, of whom 21 were operated upon. The total mortality, therefore, would appear to be 66 per cent., whilst the mortality after operation works out at 52.5 per cent."

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* Corner and Sargent, Volvulus of the Cecum, Annals of Surgery, Vol. 41, 1905, p. 62.

Case VI. This is a good example of what happens if you treat your volvulus cases upon Mr. Asquith's principle of "wait and see." It is even less satisfactory in surgery than in politics:

A woman, aged 49, was admitted with a history of absolute constipation for the previous ten days. On admission the patient appeared not so ill as the circumstances of the case would suggest; the pulse, however, was quick and running. The abdomen was distended, tympanitic and appeared to contain much free fluid. She complained of severe abdominal pain, which did not seem to be localized to any definite part of the abdomen. Vomiting was frequent and the ejecta were of a stercoraceous character. There was absolute constipation and an enema was given without good result. Soon after admission the patient was submitted to operation. The peritoneal cavity was opened by a median incision when several pints of blood-stained serous fluid escaped. The patient then suddenly became much worse, the face becoming livid and the pulse more feeble. A hurried digital examination of the alimentary canal was made, but it was not possible to locate the obstruction. A projecting coil of intestine was then stitched to the abdominal wound, incised, and a glass drainage tube fixed to it. Several pints of brown fecal-smelling fluid escaped. A few hours afterwards the patient died, never having recovered from the condition of collapse which came on during the operation. At the post-mortem examination the abdomen was found to be the seat of general peritonitis and the small intestine was distended for its entire length to more than twice its ordinary size. The cecum was dilated to six times its normal size and extended upwards into the epigastrium and the left hypochondrium. It was twisted upon itself to form a volvulus. The twisted portion of the intestine extended from the ileo-cecal valve to the middle of the ascending colon. The portion of intestine opened was a few inches below the termination of the duodenum.

Treatment. Early diagnosis, therefore, as in all cases of intestinal obstruction, is the key to successful treatment and early diagnosis is even more desirable in cases of volvulus than in other forms of obstruction. The mere twisting of a loop of bowel upon itself does not appear to be associated at first with very acute inflammatory changes and there is no great amount of plastic effusion for some time after it has occurred. Early operation allows the bowel to be emptied and untwisted with comparative ease. The loop involved is paralyzed owing to absorption of toxins from its imprisoned contents, but gangrene and peritonitis are of late onset. An operation should be performed in every case as soon as the patient is seen. It should be carried out as rapidly as is consistent with safety. It is of the utmost importance that a sufficiently large incision should be made in the abdominal walls to give free access to the viscera. It is clear on reading the records of the cases of volvulus that some of the patients died unrelieved even after operation because the twisted portion of the intestine was not discovered until the post-mortem examination. When the abdominal cavity has been opened an examination should be made first of the cecum, then of the sigmoid, but it should be borne in mind that the small intestine is occasionally twisted. The distended loop of bowel should be packed off to prevent other parts being soiled and it should be opened at once because it is easier to make a systematic examination with the loop flaccid than with it distended. Close the opening with Lembert's sutures after the edges of the incision have been disinfected and then proceed to examine the twist. It may prove to be so simple that a couple of turns in the reverse direction will unravel it. It may prove so complicated as to need all the operator's skill and ingenuity and he may still be foiled. In such cases it may be necessary to make a temporary artificial anus. If it is necessary to do so, be careful that you are really above the seat of the stricture.

Case VII. There is an interesting specimen in St. Bartholomew's Hospital Museum (No. 2177b) in which the artificial anus was made in the posterior aspect of a twisted cecum, where it was not only useless but effectually prevented any reduction of the volvulus.

The history attached to the specimen makes it clear that the case was diagnosed incorrectly. The museum catalogue states that it is "The cecum, the lowest part of the ileum and the colon. This portion of the intestine is involved in a volvulus which has resulted in the intestine being twisted three times on its transverse axis from right to left. The cecum is attached by sutures to the abdominal wall, a portion of which is left in the preparation; it is gangrenous in patches, and in one place has completely ulcerated so as to lead to a perforation of the intestine. No feces have escaped, however, owing to the surrounding adhesions. On tracing the gut backwards it is seen that the colon beyond the splenic flexure, instead of passing across the abdomen to form the transverse arch, descends vertically to the left iliac fossa. It returns from this point to the lower border of the stomach, forming a U-shaped bend. It then turns to the right and, having reached the median line of the abdomen, again runs downwards to end in the cecum, which was situated over the last lumbar vertebra almost in the middle line.

The specimen was obtained from a man aged 63, who was seized suddenly with severe abdominal pain and vomiting. His bowels, which had been regular up to the time of the seizure, became obstinately constipated. On his admission to the hospital two days later nothing could be found to account for the pain, but there was a slight fullness and tenderness in the right iliac region. Stercoraceous vomiting set in eight days after the onset of symptoms and the abdomen was then opened in the middle line and a portion of inflamed and distended cecum was secured by sutures to the abdominal wall. The patient died on the following day."

After-treatment. Your responsibilities begin when the operation is completed and the surgeon has gone home, for you are entrusted with the after-treatment. You have to remember that a segment of paralyzed gut lies in the peritoneal cavity, that an incision has been made into it and that the incision has been sutured. It must not be overstimulated for a few hours nor overloaded. Repair takes place readily and is sufficiently complete for all practical purposes within seventeen hours of the operation. Recovery from the paresis is more gradual, but under favorable circumstances it is complete. The patient should not be given anything by the mouth for the first twelve hours after the operation, though the mouth may be rinsed out with warm water from time to time if thirst is distressing. Three or four doses of pituitary extract in the form of hypophysine may be given hourly by the injection into the muscle of ½-1 cc. in the hope of causing contraction of the involuntary muscle of the body, thereby stimulating the unstriated muscle of the intestine. Turpentine enemata, too, are serviceable as stimulants to the partially paralyzed large intestine.

Instead of making general statements, however, it will be profitable to ascertain what was actually done in the matter of after-treatment in the case of volvulus which recovered. Here is the record of the after-treatment of the first case:

> The operation was completed at 3.30 P. M. Immediately upon the return of the patient to the ward a saline rectal injection was administered consisting of twenty ounces of a three-quarter per cent. solution of common salt at a temperature of 98°-100° F. The enema was given slowly and as the patient was not very collapsed it was found possible to introduce only about fourteen ounces. One-drachm doses of water were given every half hour from the time the patient recovered consciousness after the anesthetic until twelve o'clock midnight. After this hour the sips of water were replaced by two-drachm doses of albumin water, made by mixing the white of one egg with eight ounces of sterile water in which five grains of salt were dissolved. The albumin water was ordered to be given every half-hour (if the patient was awake) alternately with an equal quantity of whey. The albumin water and whey were given alternately every half-hour until eleven A. M. on the day after the operation. From eleven A. M. on the morning after the operation and for the next twenty-four hours an ounce of peptonized milk, whey or albumin water was given every hour during the day and every two hours during the night, unless the patient was sleeping. The amount was increased to two ounces hourly from midday on the second day after the operation. On the third day malted milk, beef essence, chicken broth, calf's foot jelly and weak tea were ordered to be given in doses of three or four ounces at a time every two hours by day and every three hours at night, if the patient did not vomit or complain of pain. The same diet was continued on the fourth, fifth and sixth days, the amount being increased to four or five ounces each time.
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> On the fifth day she was allowed a thin slice of bread and butter without any crust. No change was made on the sixth day. The patient was allowed a little pounded fish and a custard pudding on the seventh day. On the eighth day she was permitted to choose either pounded fish or pounded chicken and was given in addition a lightly boiled egg and a larger quantity of bread and butter. On the ninth day she had boiled fish and mashed potatoes for her dinner and on the tenth day boiled chicken and mashed potatoes with a milk pudding afterwards. From the tenth day onwards she was put upon the hospital "convalescent diet," which consists of tea, half a pint, and butter, half an ounce, twice a day; mutton chop (dressed without bone), four ounces, or one of the following: minced or pounded meat, four ounces (dressed without bone); fish, four ounces; rabbit, four ounces; mashed potatoes, six ounces; pudding (not suet), eight ounces; milk, two pints; bread, twelve ounces.
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> The local treatment consisted in passing a rectal tube every four hours (as the tympanites was great) up to the fifth day, by which time the abdomen had regained its natural size. One cc. of pituitrin was given hypodermatically as soon as the patient returned from the operating theater and this was repeated in the course of the evening. Two hours after the operation a turpentine enema was given consisting of one pint of soap and water, one ounce of turpentine and one ounce of olive oil. Two hours later an enema of asafetida was given at a temperature of 100°-105° F. An ordinary soap and water enema was given daily until the tenth day. On the day after the operation, as the tympanites had not decreased, one-one hundredth of a grain of sulphate of physostigmin (eserin) was given hypodermatically and was repeated for the following six hours.
>
> An ounce of castor oil was given by the mouth on the tenth day and this was followed on the eleventh morning by a dose of magnesium sulphate. The dose of sulphate of magnesium was repeated night and morning as often as it was required during the remainder of the patient's stay in the hospital.

You will see from this record that the after-treatment was directed to a reduction in the tympanites, for we recognized that the tympanites was a measure of the intestinal paresis and that as the distension diminished the patient would improve.

CHOICE OF METHOD IN THE TREATMENT OF FRACTURES.*

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If one consult the literature concerning fractures, in the text-books, periodicals or monographs, one is immediately struck by the fact that the result of treatment in fractures, by any other method except that advocated by the individual author, is very bad. Still more remarkable is the fact to be gathered by a study of the supposed authorities upon the subject that the methods of treatment which in one man's hands have led to most excellent results are condemned by another as worthless or dangerous. this is certainly confusing; but what perplexes the student still more is the fact that when he encounters the results obtained by the average medical practitioner in his treatment of fractures, he finds, no matter what the method used, an appalling percentage of poor results.

There must be some definite reason for the difference of opinion as to the proper method of treating such common injuries as fractures; and there certainly must be some cause for the discrepancy in the published reports and the actual results encountered in practice.

It is my purpose here to tell what in my opinion is responsible for this anomalous condition of affairs. With the elucidation of the cause, the remedy is not far to seek.

When bones are fractured there is not only injury to them, but also more or less injury to the surrounding soft parts. As a consequence, there is present, besides the actual tearing of the tissues, hemorrhage and muscular irritation. Immediately following the injury the muscles are completely relaxed and there is no difficulty in placing the fragments in alignment. But soon after the direct shock of the injury has subsided, reflex and direct muscular irritation begins and leads to spasmodic contraction. As the fragments are free, or later when the callus is still soft and deformable, the force of muscular contraction, instead of acting upon the joints, is exerted upon the yielding callus. Thus the site of the fracture is converted into a partly or completely uncontrolled joint and the fragments are dislocated upon each other.

It is our aim in treating fractures to replace and to retain the fragments in their normal anatomical relation until consolidation is complete. In order to do this we must, first of all, know the obstacles to be overcome. Though the action of gravity is fully appreciated, the fact that muscular contraction is the largest factor in resisting not only the reposition of the fragments, but also their retention, is rarely sufficiently emphasized by writers and teachers upon the subject. It is because it is too frequently forgotten that the muscular contraction will continue to act upon the fragments and cause dislocation even when the action of gravity has been overcome, that the surgical dressing applied is ineffectual.

Unless the splints, no matter what their nature, or how applied, resist the muscular spasm, deformity is sure to occur.

Thus in fracture of the femur, for example, dislocation of the fragments is almost sure to take place in a plaster of paris bandage which does not include the hip, the knee, and the foot. Unless the bandage is applied while the muscles are completely extended and this extension is maintained when the plaster has set, subsequent muscular spasm will lead to overriding.

Such a bandage perfectly applied will in the majority of cases lead to a good result. But the practitioner who endeavors to apply it must have had the proper training, and he must have the proper apparatus necessary for its application at hand, if this procedure is to be successful. As few surgeons, and fewer general practitioners have either, it is not surprising that this method of treatment has been to a considerable extent discredited. The ill results complained of by surgical writers are not due to any inherent faults in the method, but to the lack of skill in its application. In the hands of the expert the plaster of paris bandage is an excellent method of retaining the fragments in their proper relation in this as well as other fractures, for when the bandage is properly applied the fragments are held in apposition, the muscles are retained at rest, and the patient is able to be moved or be about without pain.

As so few surgeons have had the proper training to care for fractures with the plaster of paris bandage, or the necessary mechanical skill to apply splints, it is easy to understand why the operative treatment for fractures which, with hospital facilities, is comparatively easy to carry out, has been so strenuously advocated. There can of course be no doubt that there are some unusual forms of fracture which can be held in place by no other appliance except a splint applied directly to the fragments. Nor can it be denied that one can procure good results by operative measures in fractures generally. But unless the surgeon who undertakes to apply this form of treatment understands the mechanical needs, and has the facilities for perfect aseptic operating, this operative method will be a failure and the patient subjected to the risk of a fatality.

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*Read before the Orthopedic Section of the New York Academy of Medicine, March 18, 1916.

I am well aware that in the hands of the competent surgeon, who has mechanical skill and adequate hospital facilities, this risk is small; but it exists nevertheless. In the hands of those who are not competent, the life risk is not inconsiderable, and the actual results are surely no better and often much worse with this method of treatment than under any other similar circumstances.

Whatever may be the statistics or the dogmatic statement of the operating surgeon to be found in the literature regarding the results of operative treatment, my own experience, which is confirmed after operation by that of other orthopedic surgeons, has led me to believe that non-union is more frequent than, and mal-union equally as frequent as with other forms of treatment. In children with fracture of the femur, for example, I have seen both mal-union and non-union; and I can now recall two cases with non-union in which firm union in good position was obtained by a plaster of paris dressing. In these it required only the removal of the plate to make the cure complete.

I do not wish to convey the impression that operative treatment is not a justifiable or a successful method in the hands of the skilful practitioner. What I wish to emphasize is that, for the unskilful, or those not especially trained, it is just as likely, or more likely, to lead to ill results as any other method and in addition it is an operation with a distinct life risk.

It is true that the operative methods are attended by brilliant results in the hands of the skilful surgeon, with a knowledge of mechanics. Indeed, there are cases in which a really perfect anatomical result can be obtained in no other way. On the other hand, the vast majority of physicians, and these see by far the greatest part of the fracture material, have neither the training, the talent, nor the facilities of carrying out the operative methods. And their results are, as I know from experience, if anything, worse than those obtained by the older method of plaster and splint.

Thus the reason why the various writers upon this subject are able to gather statistics showing ill results from treatment by any method but the one they have supposedly discovered, or advocate, becomes evident. Not the methods, though some of them are faulty, but the inability to carry them out, are to be blamed for the disability which so often follows fractures.

Primarily, the fault lies with the training the medical student receives at college. At the present time the majority of surgical teachers are apparently content when they can impress the student with their own operative skill or ingenuity in applying complicated bandages. The student learns very little from this. The majority must practice medicine in localities far from hospital facilities; they have neither the training nor the apparatus to apply plaster of paris properly; and they have not been taught anything of the physio-pathology of fractures, or how with the means at hand they can apply the mechanical principles which should govern the treatment of fractures when they know them. Under these circumstances it is not at all surprising to find the results of the treatment of fractures unsatisfactory.

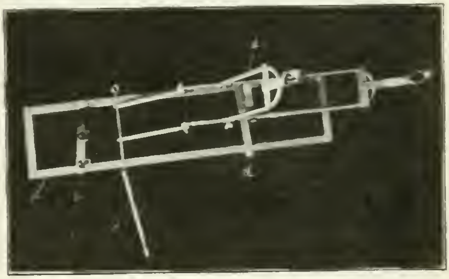

Fig. 1. Extension apparatus made of gas pipe which can be adjusted for any length and to fit in any bed. The frame and the extension apparatus proper can be extended by interpolation of extra shoulders (c) to any length. The frame is covered with canvas which has an appropriate opening for the use of the bedpan, and as the apparatus as a whole is lifted, the pan can be placed under him without disturbing the position of the parts. At (b) is a crosspiece with buckles which can be fastened to the frame at any desirable point; to this are attached peroneal straps for counter extension. A rest (d) which can be moved to any part of the frame and can be raised or lowered serves to maintain the extension frame proper at any angle The additional frame (e) fits on the leg portion of the frame and can be moved up or down so that the cord running over the pulley will pull only in a direct line. Any intelligent gasfitter can make such an apparatus

Would it not be better to spend the time now devoted to the exploitation of individual and special methods to teaching the student the pathology of the conditions under discussion, and the means, which any man of average intelligence can carry out, for treating these conditions? Certainly the student with a practical knowledge of at least the mechanical principles involved is better able to use his knowledge, and he certainly is much less likely to be a menace to the community in which he practices, than one who comes from college with only a half-baked knowledge of the operative surgery of fractures, which he has neither the training nor the facilities to apply.

Such a course in the care of fractures cannot be said to present unusual difficulties. On the contrary, the subject can be made so simple and so practical that every student when he leaves college can care for the common fractures both to his own and to the patient's advantage. It is of course impossible to demonstrate a complete course of instruction in a short paper of this kind. But its feasability is readily demonstrated by a few concrete examples.

In fractures of the shaft of the femur, for instance, the irritation and contraction of the muscle as the cause of deformity is readily demonstrated. It can be shown both in a model and on the patient, that the muscular shortening which follows the fracture diminishes the distance between the origin and the insertion point and thus prevents the alignment of the fragments when the limb is straight. Not only the muscles attached to the broken bones are irritated and contracted, but all the muscles in the neighborhood of the fracture are involved; thus not only the vasti, but the rectus and the hamstrings are also shortened. As has been said, these muscles can be made to undergo relaxation under anesthesia, and the fragments retained in position by direct splinting; or the muscles may be stretched by means of an especially devised extension apparatus or a fracture table, and the extension and the apposition of the fragments maintained by a plaster bandage.

There is still another method of retaining the muscles on the stretch, viz., continuous extension; all that is necessary in this case is to emphasize that the continuous extension must be exerted in the direction in which the muscles of the limb pull in a straight line. As this is equivalent to the position of greatest muscular relaxation, the position in which the limb must be held in order to secure reduction, the method of reduction, and continuous extension in the proper direction may be taught simultaneously. It is not necessary to burden the student with all the mathematical considerations involved; the facts may be demonstrated upon a very simple model. In the majority of cases the position of greatest relaxation is the position of semiflexion, or the middle position. Continuous extension, when it is necessary, may be applied to the limb in the position of relaxation by means of any simple apparatus.

Fig. 1 illustrates an example of such a mechanism, which is simply a modification of the extension apparatus used for many years at the Hospital for Ruptured and Crippled, New York, for extension in the line of deformity. The apparatus is constructed of gas pipe, its cost is not above a few dollars, and it can be made by any machinist in a few hours. It permits, as can be seen, of any degree of flexion and, depending upon the site of fracture, the pull may be exerted upon the femoral or leg muscles.

With such a frame it is possible to gradually extend the contracted muscle so that the bones are in absolute alignment, with the limb firmly held in the desired position. I have found that with the use of this or any apparatus which does the same thing, the average medical practitioner can obtain results which compare favorably with those of the most expert operator or the most skilful bandagist, with all the facilities of a modern hospital at his disposal.

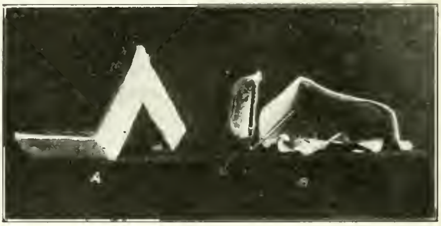

Fig. 2. (A). Abduction splint made of wood and covered with Mexican felt, of such simple construction that anyone can make it. (B). An abduction brace for the shoulder which can be adjusted for either arm and has a hing joint at the elbow.

In the majority of fractures which the average practitioner sees early, that is before muscle contraction is prominent, continuous extension is rarely an absolute necessity. If the medical man has been taught the middle position of the joints of the affected limb, he can readily acquire the little extra knowledge required to apply the simple dressing necessary to retain this position. So for instance in fracture near the shoulder joint, we know that we must overcome the powerful adductors in order to reduce the fracture. Formerly it was the practice, and this practice is still continued extensively, to set the arm and then bring it down to the side, where it is held until union has taken place. A large number of the patients so treated are compelled to undergo a long period of painful aftertreatment to regain the power to abduct the arm. Of these, not a small percentage never regain this power. For this reason it has been assumed by a number of authorities that conservative treatment of shoulder fracture is a failure and that operative treatment is the only procedure in such cases.

I know, however, from what I have seen of the results of operative procedures in these cases that the result following operative methods may be and often are no better than the conservative treatment carried out in the orthodox way.

On the other hand, when physiological and pathological phenomena associated with such injuries are taken into consideration and the treatment is based upon them, the results are as nearly perfect as surgical methods can be. Moreover, the method of procedure is so simple that anyone with ordinary intelligence can carry it out without difficulty.

It is unnecessary at the present time to go into the anatomical details. The abductors and external rotators of the shoulders will, when there is a fracture at or near the surgical neck, abduct the upper fragment and rotate it outward, while the adductors, internal rotators, and the force of gravity will bring the lower fragment close to the side. Hence, the fragments may be impacted by simple abducting and rotating the arm outward. In many cases the fragments will show no great tendency to become redislocated even when the arm is again brought down to the side. In some, however, spasm of the adductors leads to subsequent displacement.

But even in the cases in which the displacement does not occur, the adductors become shortened, as do all muscles which are left for a comparatively short time, with their origin and insertion points approximated, and in practically all cases require at least some, and in not a few a protracted period of after-treatment in order to restore the normal length of the muscles and the power of abducing the arm.

Now if, on the other hand, the shoulder is retained in the position which secures approximation of the fragments, coaptation is not only retained, but shortening of the adductors, etc., is prevented and, after union has taken place, the weight of the arm will overcome whatever shortening of the abductors has ensued, and thus the after-treatment, which has been almost entirely conducted by gravity, will be short and practically painless.

For this purpose I use either a plaster of paris bandage, which is not very comfortable, or the very simple abduction device here illustrated (Fig. 2B). This apparatus has a joint at the elbow permitting a certain amount of motion of the forearm, and can be lengthened to fit any patient and reversed to fit either arm. I have found this brace most convenient, easily applied, and worn with comfort. However, while such an instrument is advantageous, it is not absolutely necessary, for an abduction splint which carries out the same mechanical requirements can be made to fit any patient by a carpenter or by the practitioner himself, if he is at all skilful with tools (Fig. 2A).

Almost analagous conditions exist in the fractures at the neck of the femur, and there, too, any apparatus which will retain the limb in abduction will not only keep the fragments in alignment, but will prevent adductor contraction and subsequent limitation of joint motion.

The simple modification of the Thomas hip splint, here illustrated (Fig. 3), which can be fixed in any degree of abduction, may be used to retain the limb in this position. Such a splint can be made to fit any patient, it can be used as a means of direct extension in any position of the limb, and it can be made for a few dollars by any machinist. With it any practitioner, no matter where situated, can treat fracture of the neck of the femur in abduction without keeping the patient in bed; and with very little skill he can obtain results which compare favorably with those of expert orthopedic surgeons.

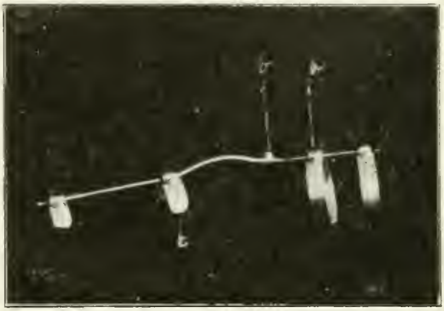

Fig. 3. Modifications of the Thomas hip splint. It consists of two shaped bands of steel connected by a bolt at (b). The two bands may be fixed by means of this bolt at any angle to each other and thus any degree of abduction may be obtained. The half rings (a) are of various sizes, and slide over the steel bands; any number of them may be placed upon the bands, serving as pelvic, thoracic, thigh, and leg bands (c), and they may be so arranged and kept in place by screws as to secure fixation and comfort. Reversed they serve for the opposite limb. The leg band may be extended and turned over at its end which when fitted with a bar may be used for extension.

These instruments are not shown with the intention of demonstrating their special merits. I claim for them no originality and there may be, and no doubt are, better ways of doing the same thing. They are presented simply to show that there are ways of treating fractures which are simple enough to be manipulated by the average practitioner.

In order, however, to apply either these or any other apparatus, the student must be taught the principles which underlie the mechanical treatment of fractures. As has been said, these are neither difficult to understand nor difficult to apply. Muscular contraction as the main cause of deformity and the position of relaxation which overcomes or prevents it in both upper and the lower extremities can be taught the student in a few hours.

In addition he need only be taught the few remaining facts in regard to the pathology of fractures. In this connection not nearly enough stress is put upon the presence of the hematoma for good or evil. The extravasated blood certainly favors consolidation. On the other hand, a large hematoma exerts pressure upon the vessels and nerves, which may lead to trophic disturbance and to long continued disability even when the bones are firmly united. In such cases gentle massage that does not hurt the patient and does not materially move the fragments, is of great assistance in expediting the return of function.

So, too, the fact that fracture near the epiphysis is likely to lead to inflammation and rarefaction of the articular ends of the bones, reactive joint effusion and joint stiffness and the method of preventing the latter by gentle passive motion, is rarely emphasized except by those who specialize in the treatment of fractures by massage and passive motion.

None of the methods advocated are effective unless properly carried out. When the student is taught the indications he soon learns how to apply them. He must, however, be taught the methods based upon the mechanical condition to be met and suitable to the facilities he has at hand. With them he can and certainly will do good work when he goes into practice.

It should, therefore, be the aim of the surgical teacher to introduce methods which both improve and simplify the treatment of fractures. It is not by the refinements of surgical technic that the percentage of good functional results will be increased —the average practitioner cannot apply them—and the vast majority of patients derive no benefit from them. To do the greatest good the methods must be simple and practical enough to be within the scope of the great majority.

The choice of method in the treatment of fractures should depend not only upon the attainment of anatomical restoration. Other things being equal, the best method is the one which requires the least skill to carry out, is least likely to endanger the patient's life, or cause him pain, permits him to be about during convalescence, and leads to complete restoration of perfect function in the shortest possible time. If all the methods proposed for the treatment of fractures are examined and the results compared according to these indications, then the long continued controversy regarding the treatment of fractures will soon terminate.

THE EARLY DIAGNOSIS OF CANCER OF THE BREAST.*

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After looking through much of the recent literature on cancer of the breast, one is impressed with the emphasis that is given to the early diagnosis in these affections. It is estimated by Bloodgood,[1] of Halsted's Clinic, that over 80 per cent. of malignant tumors of the breast are cured when operated upon before a positive diagnosis of malignancy could have been made without operation, whereas cases presenting a complete picture (clinical) of malignancy gave less than 25 per cent. of cures. Since, then, the most satisfactory and successful treatment of malignant affections of the breast, known at the present time, is surgical, and since those operations performed at an early stage of the disease give by far the best results, it is obvious that the early recognition of these conditions is of the greatest importance.

Johnson[2] states that the occurrence of tumors of the breast is a hundred times more frequent in women than in men, and since the function of lactation plays an important rôle in the breast of the female, it is deemed expedient that this dicussion be limited to the affections of the female breast.

How, then, may the opportunity for early diagnosis in breast tumors be obtained?

Women must be educated not to regard lightly abnormal conditions or symptoms referable to their breasts, and already a propaganda has been inaugurated to accomplish this end.[3] In this way, the inoperable, primary condition of malignant disease of the breast will become less frequent, though it doubtless will not entirely disappear.

Up to the time of consultation, the responsibility in these cases rests with the patient, but beyond that time the responsibility is with the diagnostician. What does it avail a woman if, after she has been persuaded to consult her physician, she does not receive the benefits of diagnosis to which she is entitled? On the one hand, breasts and their lymphatics may be needlessly sacrificed, while, on the other, malignant growths are disseminated to form metastases, or they may ultimately recur at the operative site.

Then how may we best diagnose the tumors and other abnormalities of the female breast?

One is forced to depend upon the history, clinical signs and symptoms plus the macroscopic, and in some instances the microscopic, examination (the latter by frozen section, at time of operation), in making the diagnosis of malignant disease of the breast, and in differentiating this from the various other affections to which this organ is prone.

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*Read before the Medical Society of the County of Westchester, September 21, 1915.

Here let us note some of the views of a few who have contributed to the literature on this subject of clinical diagnosis of breast conditions.

In his recently published book, Taylor,[4] of New York, gives the five most frequent signs of cancer of the breast as follows:

1. Growth in breast.
2. Growth and pain.
3. Pain alone.
4. Retraction of the nipple.
5. Growth in axilla.

"One or another of these five symptoms," he says, "is the first sign of a carcinoma of the breast in 95 per cent. of the cases." (Referring to an analysis of 500 cases at the Middlesex Hospital, London.)

Kelly and Noble[5] say that "the diagnosis of malignant tumor is based upon the palpation of the tumor and the surrounding breast; changes in the skin and subcutaneous fat and the change in the nipple."

Cancer of the breast without tumor is scarcely to be considered, except as in an incipient or pre-cancerous stage, and as such does not admit of a diagnosis. However, of all breast tumors, it is estimated that 90 per cent. are malignant and that of these 80 per cent. are carcinomata.

Lyle,[6] in speaking of benign tumors of the breast, includes lipoma, angioma, enchondroma, endothelioma, and the fibro-epithelial tumors, and quotes Bloodgood as follows: "We regard every breast tumor as potentially malignant, and advise immediate removal."

On the other hand, Bainbridge[7] urges the importance of bearing in mind: (1) That causes other than malignancy may give rise to tumors in the breast; (2) that some of the so-called characteristic and classic signs of cancer, such as retraction of the nipple, elevation of the breast, and pain, may exist entirely independently of malignant involvement; (3) that by more careful diagnosis, unnecessary mutilation may often be obviated; (4) that certain special surgical principles should be employed in operating upon the breast if the prevention of cancer is to be fostered." "Local manifestations of other diseases," he states, "are always to be thought of in connection with tumors of the breast, notably, tuberculosis, syphilis, Hodgkin's disease (pseudoleukemia), and chronic intestinal stasis. It has long been known that the breast may be the seat of tumor formation in certain 'systemic' diseases, as well as in 'specific' affections, and yet it is by no means unusual for practitioners to refer patients to surgeons for the removal of the breast in cases which are amenable to treatment by other means, and in which such surgical intervention would entail unnecessary mutilation"

Lockwood,[8] consulting surgeon to St. Bartholomew's Hospital, London, begins his book on cancer of the breast with the following statement: "The method pursued has always been the same. First, the clinical examination, and afterwards the scientific microscopical investigation. The latter is done at the beginning of the operation and as soon as anesthesia is established. The extent of the operation is determined by the result. An innocent tumor is removed by a small, local incision; a malignant one by a complete extirpation." He emphasizes the value of the clinical observations, saying: "The microscopical diagnosis is made so easily that there is a danger lest by some it be allowed to overshadow the clinical diagnosis. But the importance of the clinical diagnosis cannot be overrated. Correct clinical observation followed by correct clinical reasoning may save the patient an unnecessary operation. He considers the age of the patient as an element in estimating the probabilities. A breast tumor in a young woman is more apt to be innocent than malignant. The chronic forms of mastitis become less frequent as age advances. Up to the age of 50, chronic mastitis seems, according to Lockwood, more likely to lead to a formation of cysts, but after 50 it is often associated with cancer.

"Inflammatory tumors of the breast usually cause pain and discomfort from their earliest stages. It is, of course, difficult or impossible to arrive at definite conclusions about subjective symptoms, such as pain or discomfort. Once a tumor is known to exist, the victim may imagine that it is painful. But subjective sensations are important, and ought not to be ignored or minimized. In the beginning, a malignant growth in the breast is, as a rule, free from pain. Later, when it has grown for months, sudden intermittent stabbing pain is felt, but this may be an early manifestation. Early and continuous pain may be felt when the tumor is inflammatory," also, "Inflammatory tumors of the breast are usually tender, while tumors both innocent and malignant seem to possess a peculiar insensibility. However, little reliance can be placed upon this sign," but, "when a lobe of the breast is chronically inflamed, then the tumor is often pyramidal with its apex toward the nipple and the base toward the periphery of the breast. The apex of the pyramid may be felt joined to the nipple by a cord which is the inflamed and thickened duct."

The *rate* at which a tumor grows is usually a matter of conjecture. Cysts and innocent adenomata may grow rather quickly, while cancers that are ultimately fatal may be very slow. This author emphasizes, however, that the continuous growth of a tumor—whether the growth be fast or slow—should awaken suspicion. A cancer may actually become smaller, "but," he cautions, "the diminution in size is not to be trusted, the primary growth in the breast may cicatrize and diminish, while the growth is proceeding apace in the lymphatic glands."

Dimpling of the *skin* over the tumor of the breast, even when there is a small nodule present, should excite suspicion, but it should not be forgotten that this phenomenon may occur in connection with harmless tumors.

Enlargement of the axillary *lymph* glands is a diagnostic sign of value, to be sure, but its absence must not lead to error, for Lockwood says, "lymph glands which can neither be seen nor felt may be invaded in the very beginning." Besides the discovery of enlarged glands is difficult, and sometimes impossible, in stout patients. Furthermore, cancer does not always spread into the axillary glands. Inflammatory affections of the breast may be accompanied by enlargement of the axillary glands. They may be enlarged during pregnancy, too, when the mamary gland is undergoing evolution.

The presence of a tumor may not always be elicited by palpation and the consistency of the tumor may be misleading, for a tumor which fluctuates, and which is apt to be considered a cyst, may have a malignant papilloma growing into it, or carcinoma in its wall, or in the breast tissue near by. Such possibilities should not be overlooked.

Multiple tumors in the same breast favor benignancy, but Lockwood cautions against laying too much stress upon this sign. Simultaneous bilateral tumors, in his experience, are rare, but consecutive bilateral tumors are apt to be malignant. "The chances of cancer of one breast being followed by cancer of the other are not less than 5 per cent.," and, "putting cysts and mastitis aside, innocent tumors of the breast are seldom bilateral."

With reference to the situation of tumors, Lockwood says: "Cancers, like the innocent tumors, were met with rather oftener in the right breast, but the side in some of the earlier cases has not been noted. The preponderance of growths in the superior part of the mamary glands is somewhat remarkable. But that part of the breast is certainly more exposed to injury."

Cysts of the ampulla, while rare (about 2 per cent. of Lockwood's cases), may be either benign or malignant. The discharge from the nipple (the diagnostic sign) may be transparent and slightly viscid, or it may be sanious, more often the latter. "The presence of blood does not of necessity imply malignancy, but only that the intra-cystic growth is very vascular; it is, however, an element of suspicion."

He cited cases from which he concluded that "no tumor is to be felt, and there is no retraction of the nipple when a dilated ampulla contains an innocent papilloma; but when the intra-ampullary growth is malignant, a tumor may be felt and the nipple may be retracted. Apparently nothing is to be inferred as to the character of the growth from the nature of the discharge from the nipple."

Lockwood calls attention to the importance of diagnosing malignant affections of the nipple and areola because of their favorable situation, anatomically, for dissemination of the disease. Also to the fact that a malignant tumor may be encapsulated, hence one must guard against the error of taking it for granted that every encapsulated tumor is benign.

The last points, namely, the affection of the nipple and areola and the possibility of a malignant tumor being encapsulated, have been mentioned by Murphy,[9] of Chicago. According to this observer, cancer is often encapsulated, and is then the most dangerous lesion that occurs in the breast. In relation to "Paget's disease" of the nipple, he says: "This affection is more outrageously managed than any other disease of the mamary gland," an he emphasizes that it "is a cancer from the very first day that you see that little sore. It is the most wicked type of cancer which occurs in the breast." "Paget's cancer," as he prefers to call it, has a final cancer mortality of something over 90 per cent., as it is operated now. With reference to the microscopic diagnosis of cancer, Murphy always likes to see the gross specimen and to make his own interpretation of its appearance, and to contrast that with the interpretation of the pathologist. "When the clinical history," he says, "does not correspond with the microscopist's findings, then we usually side with the clinical history. Our observations have covered a number of years, so we have fairly positive convictions about it, based on the subsequent history of the cases. We always want the microscopist's report, and have the greatest respect for it, but it is only one of the elements in making a differential diagnosis, because we have tumors which, while microscopically malignant, are clinically benign and vice versa. Tumors are reported again and again as non-malignant and yet finally terminate the life of the patient by recurrence, showing they were malignant. That is how we have come around to this conviction." He advises the removal of the tumor, if necessary, in order to make the diagnosis.

In this connection, Rodman,[10] of Philadelphia, holds that the only rational procedure is to remove all of the tumor, with a reasonable amount of surrounding tissues, and to submit all to the pathologist for an immediate report after making frozen sections. He thinks this the only way to make the diagnosis reasonably certain.

Cullen,[11] of Baltimore, calls attention to Bloodgood's work in this connection, as follows: "Bloodgood, after the most careful and painstaking study of the cases at the Johns Hopkins Hospital, has found that to remove a piece of cancerous breast for microscopical examination, and then delay several days for the report of the pathologist, is a most dangerous procedure, as nearly all these patients have a recurrence."

LABORATORY TESTS.

The *clinical* diagnosis of the tumors of the breast has presented so many difficulties and inaccuracies that an extensive literature has developed within recent years detailing the efforts to supplement or supplant the older method.

Kahn[12] has recently given a thorough digest of all these new tests, appending a comprehensive bibliography from which it is to be surmised that there is little to be hoped, in the near future, with regard to a dependable method for the early diagnosis of malignant neoplasms, and for the differentiation thereby of malignant from benign affections of the breast. It seems, however, that there is enough of encouragement in some of the lines of investigation to warrant research workers in continuing their efforts in the direction of discovering or perfecting one or more of the numerous methods which have been proposed.

Of the various tests and reactions suggested perhaps the one to which most attention has been devoted is the *Abderhalden* serum test. Contradictory results, as is usually the case with new methods, have been obtained by different observers. Goodman and Berkowitz,[13] in a series of cases of malignancy in which there were seven cases of cancer of the breast, obtained thirty reactions out of thirty-three cases in which the results corresponded to operative, postmortem, and clinical findings. Berghausen[14] reported positive reaction in some instances of suspected malignancy. He obtained better results, as a rule, when the tissues were selected from the region corresponding to that in which the cancer was suspected. Levin,[15] on the other hand, sums up his most recent contributions on the subject in the following discouraging words: "The analysis of the results of the present investigation seems to indicate that the more accurate and objective the test employed for the detection of the specific ferment reactions in the blood serum, the less difference can be detected between the reactions obtainable with normal and supposedly specific serums. The diagnostic value of the Abderhalden reaction in cancer is, therefore, to say the least, doubtful, and it must be stated very emphatically that for the present the method belongs to the research laboratory and not to the clinic."

Of the numerous urinary tests for early diagnosis of cancer, the reaction of Solomon and Saxl is among those most extensively tried. Goodridge and Kahn,[16] of the Biochemical Laboratories of Cornell University and Beth Israel Hospital, tested this method in a series of fifty-nine cases, among which were five cases of cancer of the breast. "In the results," they say, "for fifty-nine urinary examinations of cases of cancer, the colloidal-nitrogen per cent. was generally increased to as high as 5.75 per cent. of the total nitrogen, the minimum being 3.4 per cent. Fifty-eight of the fifty-nine cases of cancer gave a positive Solomon and Saxl reaction. We are doubtful whether the case in which it was negative was true malignancy, the diagnosis having been made clinically." This negative case was one of cancer of the stomach, presumably. The author concludes, "that positive results with either the colloidal-nitrogen test or the neutral-sulfur test alone are not indicative of carcinoma. When performed conjointly on urine of the same case, however, positive results with both methods are strongly indicative of malignancy."

Among the other tests for malignancy are the *carcinoma skin reaction* of Elsberg, Neuhof, and Goist, proposed in 1910; the *Vanslyke amino-nitrogen* determination; the *Wassermann* reaction; the *Ransohoff anaphylaxis* test, and the *Meisostagmin* reaction. Each of which has received its quota of attention, chiefly at the hands of laboratory investigators.

CONCLUSIONS.

From the foregoing, then, the following conclusions may be made:

(1) The *clinical* signs and *history* must form our basis for a diagnosis of malignancy in the breast.

(2) *Serology* and other general *laboratory* tests, as at present perfected, are not dependable for the diagnosis of these cases.

(3) Repeated examinations, at regular intervals, are desirable in doubtful breast tumors. But,

(4) The complete *clinical picture* should not be waited for before operation is advised.

(5) The influence of *physiological development* and *atrophy* of the breast, in which a tumor is present, should aways be kept in mind.

(6) Most tumors of the female breast at or near the *twentieth* year are benign, whereas, at or near the *fortieth* year, they are malignant.

(7) *Section through* or *into* the tissue of a tumor of the breast is never justifiable for the purpose of diagnosis. Well defined growths should include surrounding tissues when removed, but ill defined ones are best removed with one-fourth, one-half of the entire mamary gland.

(8) Gross examination of the *fresh specimen* by a well qualified pathologist, at the time of operation, is safer than the examination of *frozen sections* alone.

(9) We should not be content with a partial operation in breast tumors, if there is a question of malignancy. Only the removal of the lymphatics and the entire breast can effect a cure in these cases.

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PROSTATIC NODES—THEIR CLINICAL SIGNIFICANCE.

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Upon rectal examination the normal prostate imparts to the examining finger a uniformly smooth and even surface at both of its lobes and isthmus. It gently and gradually encroaches upon the rectal lumen, so that a perceptible projection is readily distinguished, but not enough to suggest an actual ridge or crest. Exceptions to this gross anatomical rule do occur, but in the large majority of cases the above delineation holds true.

Various diseases, such as gonorrhea, tuberculosis and malignancy may give rise to alterations in the anatomical contour of the gland. Without in the least under-estimating the gravity and importance of the latter two, I shall dwell mainly upon the former as an etiologic factor of moment in the causation of nodular formations in the prostate. It may be stated with certainty that seventy-five per cent. of all cases of prostatic nodes are the result of gonococcic invasion and form no inconsiderable contingent to the type of so-called chronic gonorrhea. Unhappily our medical nomenclature for centuries has been responsible for the ambiguity that still clings to the various descriptive terms, such as chronic gonorrhea, chronic urethritis, etc. A chronic gonorrhea or urethritis is not always a chronic involvement of the urethral canal, particularly so when induced by gonococcic prostatic infection or spermatocystitis of the same origin; it should be termed a gonococcic prostatitis, or prostatitis gonorrhoica.

When gonococci gain entrance into the ducts and crypts of the prostate through the process of extension, proliferation of the parenchymatous tissue takes place with a concomitant plastic exudate into the stroma of the gland, so that in the course of time nodes may develop in the substance of the prostate, particularly so in its lobes. Very rarely if ever, do we find the isthmus implicated. When such a prostate is examined—and for a proper and thorough examination we must dispense with finger cots, as they mar the sense of touch to no inconsiderable degree—instead of detecting a smooth and even surface, the finger readily recognizes elevations in the substance of the gland, prominences here and there, separated by normal prostatic tissue. If pressure is brought to bear upon these nodes—as they are termed—one of two kinds can be readily determined: soft, elastic and yielding prominences, the so-called *soft nodes;* or indurated, resisting and plastic ones—*hard nodes.*

The former are accompanied by a more or less copious discharge of prostatic fluid at the meatus, the latter yield very little or no secretion. The prostatic secretion thus obtained harbors numerous cocci, among which the gonococci are easily detected. It is often very difficult to obtain secretion for microscopic examination from the hard nodes.

Urethroscope examination, both anterior and posterior, is negative, and the only apparent evidence of gonococcic infection, therefore, is in the prostate. The urine of the patient suffering from soft prostatic nodes, upon a three- or five- glass test, may show flocculi and filaments, in the second and third tube (with preliminary irrigation), and in the forth and fifth tube upon prostatic massage. In those suffering from indurated nodes, the urine presents a negative character, so that little dependence is to be placed in such a case upon a three- or five-glass test. Ascitic agar cultures frequently yield colonies from the prostatic fluid expressed from the soft nodes.

The clinical significance of these nodes is obvious. While the patient may be entirely free from a urethral gonorrhea and the urethroscope fail to elicit any positive evidence of infection, the prostate is the organ that bears the brunt of the process. And this may continue indefinitely for years and years, with frequent recrudescences in the form of an acute specific urethritis, and a potent source of infection to others, a menace to the individual's health. For we cannot deny the fact that there is a constant absorption of gonotoxin, as has been proved by many observers, the effects of which manifest themselves in the form of different myalgias and arthralgias with no appreciable alterations in the muscles and joints thus affected. Other vague symptoms are complained of by the patient, which I believe have their origin in the prostatic lesions. Hence nodular involvment of the structure should always be considered of grave consequences and not lightly dealt with. Our conception of gonococcic infection in general may change radically within a decade or two. It is to be no longer regarded as a local affection only, but as a systemic disease of far-reaching importance.

Aside from being a source of absorption, the gonococcic nodes in the prostate vitally alter the prostatic secretion, a secretion so essential in the process of procreation, that sterility is one of the inevitable and sad results of such infection. It has long been determined that the seminal secretion without the admixture of the prostatic fluid loses one of its essential prerequisites in the process of impregnation. The spermatozoa without this auxiliary function of the secretion of the prostate are inactive. A pathological secretion of the prostate, therefore, is unable to activate the seminal fluid and sterility may thus be the outcome. Another function of the prostatic secretion that has not been universally recognized is its influence upon virility. While in a great measure the prostatic fluid is eliminated by ejaculation and unconsciously escapes with the urinary stream, and occasionally appears at the meatus, some of it is also absorbed and has a powerful effect upon sexual potency, not unlike that of the testicular secretion which has long been known to materially influence potency. An absence or pathologic modification of the prostatic secretion, either qualitatively or quantitatively, induced by gross morbid conditions of the gland will in time give rise to partial or complete impotence, aside from the mechanical rôle the prostatic fluid plays in activating the seminal secretion. Hence the clinical significance of prostatic nodes the result of gonorrheal infection, will become apparent to the practitioner at a glance, if he bears in mind the organic and functional disturbances they may create in the sexual sphere.

The treatment is unsatisfactory. If once the process has become localized in the prostate as foci and nodes, it is very difficult to eradicate it. Medicating the posterior urethra has been recommended with indifferent success, however. Likewise massage has proven futile in the majority of cases Vaccinotherapy perhaps holds out some hope, if used early and systematically.

Of late operative interference has been advanced by some as a rational measure, and yet there are cases where prostatic drainage has availed but little and the patient has returned with the same gonorrheal discharge and the nodes still persisting after operation. Enucleation of the gland perhaps is the only logical measure. And yet there are objections even to that, if one bear in mind the functions of the prostate. No man desires to submit to an artificial impotence and sterility, even if it be only partial in character; in short, he does not want to be unsexed in a sense. If again we let the process continue unabated, its chronicity may be instrumental in causing enlargement of the gland in advanced middle age, when operation eventually becomes imperative. The treatment is problematical at its best. But if the process tends through its chronicity to induce enlargement of the gland in late years, enucleation is the only alternative.

To summarize:

1. Gonorrhea is the most common cause of prostatic nodes.

2. By reason of the latter the prostate is altered, both structurally and functionally.
3. The prostatic secretion produced under these circumstances is no longer a normal and physiological secretion.
4. As such it can no longer activate the spermatic fluid and the result may be sterility.
5. Furthermore, the normal prostatic secretion exerts a powerful influence upon virility, and if pathologically altered it may thus cause partial or complete impotence.
6. The prostatic nodes are sources of toxin absorption and responsible for the subsequent train of symptoms thus engendered.
7. The treatment is unsatisfactory and problematical.

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SURGICAL LONDON.

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To the average American London is always delightful. If he be a physician the pleasure is increased, for he soon realizes that here he can revel to his heart's content in a medical lore and tradition that dates back to the time when his own country was yet the home solely of the Red man.

As one roams from metropolitan hospital to hospital, and from school to school, one becomes fascinated not so much by what these represent today but by the unapproachable glory of their traditions.

One visits St. Thomas's and learns that it was at this institution that William Cheselden did some of those famous anatomical dissections which in 1711 brought down upon himself the censure of the dignified Company of Barber-Surgeons for "procuring the dead bodies of malefactors from the place of execution and dissecting the same at his own house."

Or at Bart's he is told it was while a surgeon there, in 1756, Percivall Pott, as a result of a fracture to his own leg, made a special study of that condition, which gave to the world the fracture that is still universally known by his name.

And so one passes from the stages which held John Hunter and his equally famous pupil, John Abernathy, the latter of whom established the Medical School at St. Bartholomew's Hospital; and Sir Astley Cooper, who organized the teaching department at Grey's.

He is still remembered as being the handsomest and most genial London surgeon of the early days of the last century, which are bridged to the present generation by memories of Sir Benjamin Brodie, Robert Liston, Sir James Paget and Joseph Lord Lister.

The generally accepted belief that Harley Street includes within its confines most of the best known surgeons of the metropolis is a mistaken one. While this thoroughfare still is preeminently given over to consultation rooms, it is by no means the Holy of Holies. I find that many of the most eminent surgeons live in other sections, although such adjoining streets as Wimpole Street and Cavendish Square are noted for names of international repute. In Cavendish Square are to be seen the plates of D'Arcy Power, Arbuthnot Lane and Victor Horsley, while at number one Wimpole Street is the magnificent home of the Royal Society of Medicine. The Royal College of Surgeons is some distance away. It is a noble structure, situated in Lincoln's Inn Field, off Kingsway. The Examination Hall, where examinations are held for diplomas of the Royal College of Physicians and Royal College of Surgeons, is situated in Queen Square, Bloomsbury, a secluded spot reached from Southampton Row.

London, naturally, supplies much of the medical instruction for the British Empire. The schools are part and parcel of the great hospitals, and as the clinical material is practically unlimited, students have full opportunity to become acquainted at first hand with the diseases they are taught. I was especially struck with the great amount of personal instruction in vogue. Much of the day's work of the advanced students consists in individual teaching. For instance, at Bart's the out-patients are utilized for instruction purposes to the fullest extent. The teacher selects half a dozen cases from among the patients. These are brought into the class-room. The several dressers have already gone over them thoroughly, and have written up complete histories. The patient is introduced to the class by the surgeon, who gives a brief outline of the case as related in the dresser's History Sheet.

I shall give in detail a day's work in the surgical department, which will best illustrate the thoroughness of the instruction given.

"Out-patients" are held daily. The class consists of several dressers, and perhaps a dozen past dressers. The student in charge of that particular patient gives in outline, without notes, his description. The case is that of a woman, aged 50, housewife. She has had six children, three now living. She has had three miscarriages. She appears healthy, etc., etc. He then relates what he has gathered from her own "personal narration," following which he states what "he himself has discovered." Let us say the woman has a "lump" in her breast. He describes it on inspection. Next he states what he discovered on palpation. He gives the size, outline, consistency, states whether it is fluid or solid, smooth or irregular, hard or soft, even or nodular in outline; describes its shape, and finally gives its relation to surrounding structures. These details are gone over in a systematic manner so that the student soon acquires the necessary formulæ to be able methodically to go over his cases with a fine toothed comb, as it were.

Having thus finished, he announces his diagnosis. The instructor makes no comment on this, but very carefully questions the student as to his reasons for arriving at his conclusions. The student is "grilled" thoroughly, especial attention being paid to the anatomy and pathology as well as the surgery of the condition in point.

I found this kind of work most admirable. The co-relation and co-ordination of various branches compels the student to keep fresh in, and apply, the various subjects he has gone over in other departments, and impresses upon his mind the close relationship the different sciences bear to each other. For instance, the student has stated a case to be stone in the bladder, and has given his reasons for making that diagnosis. He will be quizzed on the urine of that particular bladder, its probable characteristics, its constituents, the various urinary tests, microscopical and chemical; the theories as to the causes given of the formation of stone, the various kinds of stone, and the treatment. If operative, the stages of the operation and the anatomy of the parts concerned are asked. During all this time he has the patient before him, and previously he has also personally instituted the various diagnostic procedures on this particular patient.

I am referring especially to the dressers. They are required to do six months of this work in the out-patient department in addition to dresserships in other departments and wards. As the classes are small, each student is called upon to go over every case, and in this very practical way the work done elsewhere is supplemented, reinforced and applied.

As might be expected, a feature of these out-patient classes is the difference of opinion developed over the same case. The instructor lends a willing ear to any student who can bolster up his case, providing he properly states his grounds. Each student has his day in court, as it were, but in the end the teacher announces his own decision. A most admirable feature is the readiness with which the surgeon acknowledges his mistakes. At the next meeting of the class he will probably display an x-ray plate which quite upsets his own previously made diagnosis, and if some student has had the good fortune to hit it when he himself missed, he graciously acknowledges it and bestows credit where credit is due.

But now let us make a visit to the wards. At 1:30 promptly in the afternoon each visiting surgeon meets his dressers in the Quadrangle preparatory to making the day's rounds.

The Quadrangle at St. Bartholomew's is an institution well worth more than passing comment. The hospital is perhaps the oldest in the world, for it dates back to the year 1123, and from its very beginning it has been used for the sick, never for an almshouse, as was common at that early period. Of modest proportions in the days of King Henry I, its growth through the centuries has been steady, until now it occupies several blocks in the very heart of the city, hardly more than a stone's throw from St. Paul's.

As the institution grew, a large courtyard was formed in its center, about which the various buildings have been constructed. The yard became known as the Quadrangle, and in rain or shine, snow or sleet, it is here that, at about 1:30 in the afternoon, congregate students and staff previous to starting on their rounds in the wards.

To an American, accustomed as he is to think of an Alma Mater dating back little more than a generation or two, these ancient structures prove awe-inspiring. As he stands in their shadows he catches a breath of days long gone and forgotten, and unless one is made of "stones and sticks or more than senseless things," he cannot help but be swayed by the quiet majesty of those somber piles which have looked down upon so many of the masters of our art during eight long centuries! For you realize that in this very place, three hundred years before the discovery of America by Columbus, still stood this venerable benefaction!

Only a cursory knowledge of the History of Medicine is necessary to muster up a few of the masters of our art whose memories yet lovingly cling to Bart's and its Quadrangle.

As you stand there on its asphalted pavements your mind's eye can see the discoverer of the circulation, the great Harvey, crossing to start on his rounds, looking neither to the right nor to the left, intent perhaps on tracing a stage in the age-puzzling blood-circle, the discovery of which was to make his name forever famous. His shadow has no sooner disappeared than you can imagine seeing Radcliffe and Mead, walking arm in arm, the latter no doubt telling a funny story, the former trying hard to look dignified but yielding in spite of all;

or John Freke, the Sergeant-Surgeon to Queen Anne, perhaps endeavoring to convince England that Queen Anne is really dead.

I have seen them all in the Quadrangle. The best days are the foggy ones, when you stand shivering in the cold damp atmosphere while Englishmen, bareheaded and perhaps in low shoes, hardly know that the temperature has fallen and a chill wind is blowing. But you can see these old Bart's men, nevertheless, in the shadows and in the mist, for there goes Percivall Pott quite near to you, and as the penetrating cold pierces your frame you easily imagine him with a hump to his back, and a projecting chest, and a hacking cough, the very picture of the thousand and one poor victims of Pott's disease you have perhaps seen. But suddenly the mist of London lifts just a little, the sun's rays glimmer, and Percivall no longer has a hump. He now is seen to limp. You look closely and know now that the limp is due to a fracture of the lower end of the fibula, and that the internal lateral ligament is ruptured, and perhaps the internal malleolus is broken off. Surely, you declare, our old friend has a Pott's fracture. Again the mist thins. Our friend of long ago has become erect, and you see him as he really was in the height of his reputation, handsome and dignified, wearing a long gray wig, a white, fluffy stock collar about his neck, and a magnificent velvet coat. He is perhaps accompanied by John Hunter, his pupil, whom he is probably gently chiding for his quarrelsomeness.

But these are no sooner vanished than the Pitcairns, William and David, materialize. David is pointing out for the first time in history the relationship between cardiac disease and acute rheumatism.

On their heels comes John Abernathy, followed at a respectful distance by his two pupils, Benjamin Brodie and the poet Shelley. You feel that at last here is your opportunity to find out what a Brodie's abscess really is, which again reminds you that you are as much in doubt also as to the real meaning of a Baker's cyst, when the shades of Morrant Baker appear.

You are beginning to wonder if there is no limit to the great names associated with the Quadrangle when over towards the Museum the shades formulate a new trio. It is Sir James Paget, accompanied by a man and woman. You think it is a man, but on closer inspection you see that it is only the skeleton of a man. The skeleton is that of the first case of osteitis deformans. The woman is proudly exhibiting the first described case of Paget's disease of the nipple.

But let it not be imagined that only ghosts appear on Bart's Quadrangle. One may see there in the flesh Sir Anthony Bowlby, the King's surgeon, and Sir W. P. Herringham, the King's physician, as well as D'Arcy Power, who, although one of London's busiest surgeons, finds time to qualify as the world's greatest authority on the history of medicine.

But let us leave the Quadrangle, having fallen in behind some particular surgeon, say Mr. D'Arcy Power, and make our way to his wards.

The dressers have during the early part of the day "dressed" the cases and written up a complete history of each case. Or they have assisted at the operation to the extent of preparing the patient, handling needles, or applying bandages. They have thus had an opportunity to observe the various stages of the operation so as to be in a position to thoroughly describe every step the surgeon has taken from the very beginning to the end. How well or illy the student has done this is demonstrated in the reading of the History Sheet. And if the account is not a correct one it must be rewritten since these papers become a part of the permanent records of the hospital.

The surgeon, standing at the head of the bed, is surrounded by his half-dozen dressers and perhaps as many or more additional students. Questions are hurled at everyone, and the ground covered includes, besides surgery, such subjects as anatomy, pathology and allied branches. The student may be required to detail the operation indicated; he may be asked to work out various incisions; he may be called upon to demonstrate his methods of palpation, or he may be invited to make a diagnosis.

In this department of surgical teaching I was again impressed with the great value of the corelation of all subjects. In the two hours of the round one has seen a series of cases, and the questions have brought out points covering all phases of surgery as well as allied branches.

I have no hesitancy in praising this method. Too much stress cannot be placed on the necessity of instilling into the minds of students the importance of thinking anatomically and pathologically when going over their surgery, emphasizing in this manner the bearing one subject has on the other or all the others. It is a mistaken notion that the one has no practical bearing on the other, or that they are only of use in the lecture hall, laboratory or dissecting room. It is a great mistake to permit the earlier branches to be pushed aside, or out of the student's mind, by the more advanced subjects as he reached the end of his curriculum. That the authorities on this side are quite alive to the importance is manifest in the character of the final examinations, which not only cover medicine and surgery as such, but include quite a good deal of anatomy and pathology as well. This, notwithstanding the fact that the candidate has already passed a satisfactory examination in these minor branches.

St. Bartholomew's can boast of at least one institution which, as far as I know, is unique in medical schools. That is what is commonly known as surgical consultations. These have been going on uninterruptedly for half a century, and form one of the most interesting features of the place. Every Thursday afternoon at 1.30, each visiting surgeon, desiring the advice of his colleagues, brings before the advanced students a case which he feels needs clearing up. Attending are as many of the visiting and house staffs as are not urgently needed elsewhere. The surgeon in charge of the patient gives an outline of the case, asking at the same time that his colleagues assist him in arriving at a correct diagnosis, or advise treatment. Each surgeon, according to seniority, examines the patient, and the latter having been finally wheeled out of the room, the consultation begins. The senior member present first has his say, and this is continued until the most junior member has given his opinion. The cases are never common ones and are usually puzzlers. The purpose of these seem to be to assist in the clarification of knotty surgical problems while at the same time permitting the senior students to get an inkling into the difficulties of the art. The patient profits most, since he thus gets gratis the benefit of the advice of some of London't best surgeons.

I cannot say that the average student is always much the wiser after one of these meetings, for the differences of opinion expressed by their masters are naturally confusing. However, they form an instructive feature, and certainly they result in turning the searchlight, as it were, onto cases of an unusual character. The surgeon himself, no doubt, finds these consultations of value, especially when he is in some doubt as to the advisability of undertaking a radical operation.

Notwithstanding that many of the permanent staffs of the principal London hospitals are now at the front, the work of instruction is not apparently abridged. The difference is made up in a great measure by added work on the part of those remaining behind. It is probably true that three-fourths of all surgeons are in uniform, and those at home are doing their own work as well as that of the absent ones.

It is a commendable fact that despite the shortage of the teaching staffs there has been no lowering of the usual high grade of instruction.

AN IMPROVED AUTOMATIC SUCTION APPARATUS FOR SUPRAPUBIC CYSTOTOMY OPERATIONS.

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The problem of post-operative drainage of the urine in cases of suprapubic cystotomy has always been of the greatest interest, and many have been the devices resorted to in order to keep the patient dry and to enable the wound to heal as quickly and aseptically as possible. Unfortunately, up to the present time, no method has been found which could be relied upon to accomplish this result in every case, or which was not so complicated in its working as to require the constant attention of an assistant. For this reason, we feel justified in presenting the automatic apparatus which we have devised, and which we have found, after a considerable experience, very useful, simple and adaptable to all classes of wounds requiring regular and constant drainage of secretions.

To be useful, any machine or apparatus proposed for this purpose must fulfil the following requirements:

1. It must be simple in character and easy of operation.
2. Its operation must be painless and free of annoyance to the patient.
3. It must be capable of aspirating any and all secretions, regardless of specific gravity or amount, which might form or collect in wounds of this character.
4. It must be automatic, and must require the minimum amount of attention.

With these ideals in mind, and after much experimentation, we have succeeded in perfecting an apparatus which, while embodying no new principle, has proven of inestimable value, and which fulfils all the demands we have thus far made upon it.

Briefly described (see illustration) it consists of a specially built Kells suction motor pump, electrically driven and automatically controlled in its working by a specially fitted clock attachment, the latter being adjustable as to frequency of action and duration of suction. By means of specially devised points or tips, any wound or cavity may be drained as often and for as long an interval of time as may be required, with practically no inconvenience or discomfort to the patient.

For a more extended description, the apparatus may be discussed under three headings:

1. The suction apparatus.

2. The clock attachment controller.
3. The special points or tips.

1. THE SUCTION APPARATUS.

This consists of a small electric motor with a built-in suction pump (Kells improved type) of sufficient power to develop a vacuum of 12 inches or more. This is connected to a graduated gallon-jar container, which in turn is connected with the appropriate point or tip which is to be introduced into the wound or cavity to be drained. Between the pump and the vacuum jar is interposed a cotton filter jar for protection of the pump against moisture. The exhaust from the suction pump is carried through a specially arranged wash-bottle filled with permanganate of potash, which acts both as a deodorizer and as a muffler. The motor pump is almost noiseless in operation, and is practically nonheating, allowing of continuous use for long intervals of time when needed. We have run these pumps for periods of twenty-four hours at a time, with no overheating or wearing whatsoever. Both motor and pump are provided with specially arranged lubricating devices, rendering it easy to attend to the necessary oiling at regular intervals.

2. THE CLOCK ATTACHMENT CONTROLLER.

This consists of an automatic make-and-break wheel which is attached to ordinary clockworks, and which can be easily changed so as to allow of the substitution of various wheels, permitting a variety of frequent and long-continued periods of suctions as may be desired. In practice, we found that a suction period of ten to fifteen seconds every two or three minutes is sufficient for the average suprapubic cystotomy wound, the apparatus sucking from two to four ounces of fluid in this period of time. The controller is fitted with a special hand-controlled snap switch, which can be used by patient or nurse whenever it may be desired to work the motor at other than the automatic stated intervals, or when constant drainage is desired. The clockworks is of the eight-day variety, necessitating only a weekly winding by the attendant to keep it in action.

3. THE SPECIAL POINTS OR SUCTION TIPS.

We have allowed ourselves the greatest latitude in devising our tips, being guided largely by the individual cases on which we have tried the machine. The essentials are an outer perforated protecting tube, with an inner suction tube of a smaller caliber. The outer tube allows an entrance for air into the wound or cavity, prevents a vacuum, and protects the lining membrane against herniation or pinching by the suction tube. It also protects the suction tube against clogging. The inner tube is varied in size, depending on the character of the fluid to be aspirated. The two tubes may be made of any material, but we have found either rubber or round-ended metal tubing to answer best. Despite their rigid character, the metal tips have proved most useful, and have been very little more annoying to the patient than the more flexible rubber ones; they have also stood wear and tear to a much greater extent. Both tubes can be frequently taken out, cleaned, sterilized and reintroduced with very little pain or inconvenience. Sample tips are shown in Fig. 1, but any variety may be substituted, provided the necessary outer protecting tube and the inner suction one be incorporated.

TECHNIC OF APPLICATION IN SUPRAPUBIC PROSTATECTOMY.

After removal of the prostate by any of the usual procedures, a larger outer tube corresponding in diameter to the one-inch Freyer rubber tube is inserted into the bladder and strapped in by passing adhesive plaster strips over its outer flanges across the skin edge of the external wound. A ⅜-inch right-angled inner suction tube slightly shorter than the outer one is then dropped into this and connected to the vacuum bottle and the clock attachment controller is adjusted and started. The surrounding wound is lightly covered with sterile dressing, allowing free entrance of air into the outer metal tube. Automatically, the suction apparatus will drain all accumulated blood, blood clots, and urine at whatever interval of time for which the clock attachment has been adjusted, and no further attention is required. Drainage is kept up by this means for the first forty-eight or seventy-two hours, with scarcely any change of dressings or bed sheets being needed, and with merely an emptying of the vacuum bottle as it fills and an oiling of the

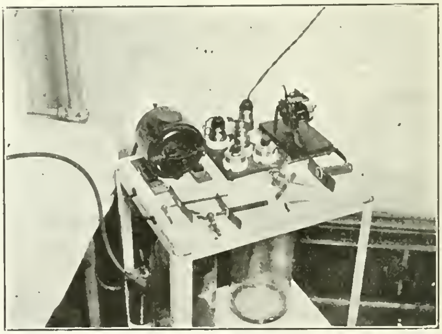

Fig. 1. Automatic clockwork controller, suction apparatus, and some special points or tips most frequently used.

motor and pump at twelve-hour intervals. The patient very quickly gets accustomed to the slight purring of the motor and, as rest in the recumbent position is an absolute requirement to avoid secondary hemorrhage, the large drainage tube is not as inconvenient to the patient as might be at first imagined.

At the end of forty-eight or seventy-two hours, as the case may be, the large outer tube and the corresponding inner suction tube are removed, the wound examined, and the next smaller sized point introduced into the bladder and connected with the aspirator. As often as desired thereafter the tips may be changed for smaller ones, allowing the wound to close down rapidly; about the fourth or fifth day it is sometimes advisable to use the rubber tips to permit of greater flexibility inside the wound, as the patient begins to sit up or move about the bed. Even then, however, we have found the rigid tubes to interfere so little with movement, that we frequently use them throughout. About the tenth or twelfth day the suprapubic wound, particularly if the two-stage operation has been done, has contracted to such a small size that it is more advisable to take out the suprapubic drain and insert a urethral retention catheter for a few days. This generally results in early closure of the suprapubic fistula.

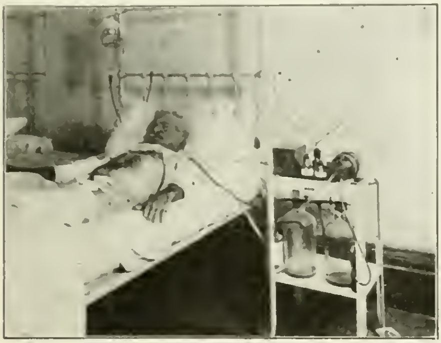

Fig 2. Suction apparatus attached to patient and in operation. The hand switch control can be seen. Individual water cooler (improvised) for cases where attendance is of a limited amount, is seen hanging from the side of the bed.

Our experiences with this apparatus have so far proved invariably satisfactory. The patient is kept more thoroughly comfortable and dry, sometimes not having to be dressed or changed for forty-eight hours at a time. The wound being dry and free from gross urinary infection heals with less sloughing, greater rapidity, and firmer union. In charity clinics, where special nursing is limited in amount, the automatic character of the device is more highly appreciated by patient and attendant, and the expense of frequent changes of dressings, bed linen, etc., is kept to a minimum. By a simple device (Kells) we have succeeded in arranging the machine so that two patients in adjoining beds may be attached to one suction pump, thereby eliminating the necessity of a separate apparatus for each case.

Finally, we would say that, while we have found this suction apparatus of value in post-operative treatment, it is even more useful as an adjunct to operative work of almost every conceivable character. By means of the hand-control and with special suction tips, it can be used anywhere, and will be found unequaled for the evacuation of abscesses, cysts, etc., wherever met. We have not as yet found any body fluid, pathologic or normal, which cannot be aspirated perfectly and without leakage, provided the right suction point be employed. A special portable suction apparatus with both the automatic and hand-controlled switches has been devised for the surgical clinics, and has been found in some ways preferable to the above illustrated type as allowing of easier transportation from amphitheater to ward, etc.

The Samuel D. Gross Prize ($1,500).

This prize is awarded every five years to the writer of the best original essay, not exceeding one hundred and fifty printed pages, octavo, in length, illustrative of some subject in surgical pathology or surgical practice, founded upon original investigations, the candidates for the prize to be American citizens.

The competitor who receives the prize shall publish his essay in book form, and shall deposit one copy of the work in the Samuel D. Gross Library of the Philadelphia Academy of Surgery. On the title page, it shall be stated that to the essay was awarded the Samuel D. Gross Prize of the Philadelphia Academy of Surgery.

The essays, which must be written by a single author in the English language, should be sent to the "Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgery, care of the College of Physicians, 19 S. 22nd Street, Philadelphia," *on or before January 1, 1920.*

Each essay must be typewritten, distinguished by a motto, and accompanied by a sealed envelope bearing the same motto, containing the name and address of the writer. No envelope will be opened except that which accompanies the successful essay.

The committee reserves the right to make no award if the essays submitted are not considered worthy of the prize.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, JUNE, 1916.

SIMULANTS OF ACUTE SURGICAL ABDOMINAL DISEASE.

In the consideration of an acute surgical abdominal affection the experienced practitioner will always have in mind and attempt rapidly to distinguish the various local conditions that may be at fault, according to the character of the signs and symptoms. Thus, before making a diagnosis of appendicitis he will try to eliminate, at least as probabilities, ureter stone, renal colic, tubal and ovarian disease, ileo-cecal tuberculosis or neoplasm. As regards acute appendicitis the diagnosis is most often correct; and in this and other acute surgical abdominal affections the establishment of the indication is more important than the pre-operative determination of the lesion.

There are, however, various extra-abdominal and various non-surgical affections that may closely simulate symptomatically, acute appendicitis and acute cholecystitis, and while this fact is generally known it often happens that the wrong diagnosis is made because these conditions are not borne in mind or are overlooked by reason of an incomplete examination.

It seems worth while, therefore, as a reminder, to refer to some of these non-surgical and extra-abdominal simulants of acute surgical abdominal disease. The abdominal pains and crises of tabes dorsalis often lead to the mistaken diagnosis of cholelithiasis or appendicitis and many unnecessary operations may be scored against the failure to exclude this spinal disease, as should always be done, before submitting a patient to the knife. Tumors, among other spinal cord diseases, may likewise cause deceiving abdominal symptoms. It is, of course, well known that pneumonia and pleurisy, at their outset, may be marked by symptoms apparently wholly abdominal and quite apt to suggest gall-bladder or other intraperitoneal disease. It is not so well known that malaria may produce, instead of, or in addition to, the characteristic chills and sweats, sharp abdominal symptoms, e. g., vomiting, fever, and localized right iliac pain and tenderness as in appendicitis, or upper abdominal pain and tenderness, even with jaundice, quite suggesting the diagnosis of cholelithiasis or pancreatitis. Acute myositis of the abdominal wall has also been described—a diagnosis to be made with much circumspection lest the opposite mistake be made of neglecting an urgent underlying affection.

Of the "medical" abdominal affections that may simulate acute surgical disease, typhoid fever and acute colitis will come at once to mind. Abdominal angiospasm, much rarer, is less apt to be thought of. Various toxic erythemata are accompanied by acute abdominal symptoms and sometimes proceed from abdominal causes. Acute urticaria, since it may also involve the gastro-intestinal tract, may be marked by sharp abdominal symptoms—vomiting, localized pain and tenderness and fever; and it is one of the conditions that may be forgotten or overlooked when the signs suggest acute appendicitis. Apert reports two cases of urticaria, one acute and one chronic, in which the diagnosis of acute appendicitis had been made on the pseudo-peritoneal syndrome. (*Le Monde Médical,* March, 1916.)

These, of course, do not complete the list of the occasional simulants of acute surgical abdominal disease. They are enough, however, to emphasize even for that very familiar affection, acute appendicitis, if not the Hippocratic saw, "diagnosis is difficult," at least that diagnosis should always include a process of elimination.

When we come to chronic abdominal affections and especially chronic appendicitis, the opportunities for mistakes, pardonable and otherwise, are many times greater.—W. M. B.

THE AMERICAN MEDICAL EDITORS ASSOCIATION.

The annual meeting and banquet of the American Medical Editors Association will be held at the Hotel McAlpin, New York City, October 25th and 26th, 1916, under the presidency of Dr. Edward C. Register, editor of *The Charlotte Medical Journal.*

[redacted]

SAMUEL M. BRICKNER.

Samuel M. Brickner, A.M., M.D., an associate editor of The Journal, died at Saranac Lake, N. Y., on May 5, after a long illness the inevitable end of which he faced courageously, uncomplainingly, even cheerfully.

His death at 49 is mourned by the host of colleagues, friends and patients who loved him. It is a loss to the profession which his scientific and literary attainments and his fine character adorned. He was an experienced gynecologist and had made notable contributions to obstetrics; but what is more important—for there are many to replace him in scientific work—he was in scholarship, temperament and character the type of physician of which we can not have enough. Gentle in spirit and demeanor, he was vigorous and active in the denunciation of professional misconduct and professional pettiness. And as he cherished and preached the highest ideals of his art, so, too, he cherished and cultivated the broader, cultural sides of that art.

His was a splendid example of devotion to responsibility in spite of illness, and of cheerful, helpful activity when illness overcame physical strength. With soldier-like bravery he continued the practice of his specialty for a full year after the recurrence of his malady told him that only by rest could he again become well. And when once more sequestered in Saranac Lake, spent in body and finally divorced from the clinical work he so loved, he called on the fine qualities of his intellect to continue the medical career which he was willing to terminate only with the death he calmly awaited. It was at this time that he joined the staff of The Journal, contributing abstracts of important gynecological and obstetrical articles. At this time, too, he edited, from its inception until his death, *The Medical Pickwick*, a literary magazine, unique in medical journalism, that has given pleasure to thousands. His editorials and his selection of contributed articles, historical, romantic, humorous, biographical, bespeak the man's culture and taste. *The Medical Pickwick* will long be associated in affectionate memory with him who gave it literary birth.

Dr. Brickner was a master of the epistolary art. Whether handwritten or dictated, his letters, always effortless, spontaneous, were remarkable for their diction, elegance and sentiment. His literary qualities are best known, however, by his verse. For this he possessed a talent which his long physical idleness gave him both the opportunity and the inspiration to indulge. During his illness he contributed several poems to lay publications, some of which have been widely quoted, notably "To R. L. S.," written for the dedication, at Saranac Lake, of the monument to Robert Louis Stevenson, "The Anti-Vivisectionist" and "The Red Cross Nurse." The finest of all of these, in sentiment, and certainly the most touching, was his valedictory, written very recently for the *N. Y. Times* and, at the author's request the day before he died, reprinted in the *Saranac Lake News*. He called it "The Feast:"

> There is no more Lucullan feast than this
> At which I daily sit:
> Laughter and sunshine, love, a tender kiss—
> These are the sweets of it.
>
> If, by chance, black stormclouds lowly bend
> My unresisting head,
> It is no symbol that my joy shall end,
> For still my feast is spread.
>
> A day will come with laughter just as sweet,
> The sun will fill the air,
> Love still be young, but other lips will meet:
> I shall have had my share!

[redacted]

SATISFACTORY IS NOT SATISFACTORY.

A typographical error occurred in the article in our last (May) issue by Dr. S. C. McCoy, to which he requests us to call attention. The last word in the first paragraph should have been *unsatisfactory* instead of *satisfactory*.

Here is a curious state of affairs: A word that is *satisfactory* is quite unsatisfactory, yet has to be made *unsatisfactory* in order to be satisfactory. When it was unsatisfactory it was *satisfactory* and now that we have made it more satisfactory it is entirely *unsatisfactory*. *Satisfactory* is unsatisfactory and *unsatisfactory* is satisfactory. What was *satisfactory* to our readers was unsatisfactory to the author and we can not make it satisfactory to him without making it *unsatisfactory* to everybody.

THE SOUTHERN HOSPITAL RECORD.

A new monthly has entered the field of medical journalism—*The Southern Hospital Record*, published at Atlanta, Ga., by Edward A. Werner and edited by him and Dr. Charles Edward Dowman. The first, and very attractive, issue, dated April, 1916, states as the purpose of the magazine to promote uniform efficiency in the hospitals of the Southern States. A perusal of this issue gives ample assurance that the new journal will indeed stimulate interest in hospital construction and administration; and we commend it to those of our Southern readers, especially, whose activities are associated with hospitals or private "infirmaries."

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

INDUSTRIAL HYGIENE.

In a discussion of the subject of industrial hygiene, J. W. Schereschewsky (*Public Health Report,* October 1, 1915) lays particular stress upon the importance of education. In view of the fact that there are about thirty million industrial workers in this country subject to the influences of occupation, it is of immense importance that unfavorable influences, menacing the health of workmen, should be given full consideration by the medical profession.

It has been estimated that the average annual loss, through sickness, to workers in this country, approximates 8 or 9 days. Upon this basis an economic loss of $360,000,000 results if the annual earnings be placed at $600. It is unfortunate that the major portion of this loss is due to ignorance or carelessness.

To obviate the action of these two factors, it is necessary to undertake a comprehensive plan of education. This must extend to all classes in society taking in employers and employees and the general public whose aroused opinion is so potent a factor in securing constructive measures for the protection of workers.

The place which the medical profession is to take in the prevention of industrial accidents and diseases is by no means of minor significance. The great advances in industrial hygiene have to a large extent been dependent upon the information offered by the profession, though the application of the information has been made more generally by laymen. There has been, in a sense, a feeling of isolation of the general practitioner insofar as industrial accidents and diseases are concerned. Too frequently it has been regarded as a specific phase of medicine to be studied only by the specialist interested in the development of better industrial conditions. It must be recognized, however, that the vast majority of patients in any community necessarily come from the productive industrial classes.

The daily contact in hospitals and dispensaries with the victims of industrial accidents and diseases yields abundant opportunity for collecting information relative to the causation and results of life in the industrial world.

The clinical experiences, thus far largely uncollected, have not been related to occupation. Even the occupation of patients is frequently dismissed as a matter of secondary importance and not germane to the medical problem. Hospitals are particularly weak in that the data at present recorded are so vague as to be of little use. Its unreliability is in part dependent upon the fact that there is a lack of a uniform nomenclature to particularize the specific occupation of hospital patients. To classify a woman as a laundry worker is too indefinite to be of service. It is necessary to ascertain whether she be a sorter of soiled linen, a mangle operator, a marker, or indeed an office assistant. Similarly, the last occupation may not be the one responsible either for the condition of disease or disability. The lead worker, for example, who most recently has been employed as a bookkeeper might have his lead colic while in the latter position.

The clinics which provide remarkable clearing houses for information relative to industrial accidents and diseases for various reasons have failed to take advantage of their opportunities and thus the progress of industrial hygiene has been retarded. The organization of industrial clinics represents a step in advance. Although unfortunately other clinics may feel that it is no longer necessary for them to pay particular attention to this phase of medicine.

The educational advantage of the industrial clinic should be quite the reverse and serve to indicate to all clinics the importance of the subject and the responsibility of clinic assistants to collate all facts possible that may cast light upon this exceedingly important face of medicine.

Inasmuch as death certificates possess unusual functions in laying the foundation of constructive remedial measures, it is desirable that death certificates should state with exactness the occupation of the deceased. This is within the scope of activities of all physicians whether in hospitals or in general practice.

Thus far the medical institutions of this country have sadly omitted to give due attention in curricula to the influences of industries upon physical welfare. The time is approaching when those devoting themselves to the organization of medical schools must recognize the social and economic phases of medicine and inaugurate changes in the curriculum which will enable proper emphasis to be given to the large problems yoking together industrial life and health hazards. The relation of information of this character to surgical services is indicated by a study of any report on industrial accidents.

The report for the New York State Department of Labor for 1914 points out that in factories, mines, quarries, and building and engineering work over eighty-eight thousand non-fatal accidents were reported within a year. Power machinery was responsible for 26.7 per cent., weights and falling objects accounted for 24.4 per cent., hand tools 10.8 per cent., fall of the person 9.6 per cent., heat and electricity 6.9 per cent., vehicles and animals 2.5 per cent. Similarly for fatal industrial accidents mechanical power was the most serious instrumentality of death.

If the reports of the combined surgical services and hospitals of a large industrial city could be compiled to indicate the relation of the surgical condition to the particular employments of the victims, there would be abundant data to show what a large burden is shifted upon the public through the ignorance, indifference, or neglect of employers and employees. Industrial plants would stand out unfortunately prominent with unusually high accident rates. This might serve as a point of departure for the improvement of industrial conditions in specific trades and occupations and indeed even in particular factories, mines and shops.

Constructive work of this character is thoroughly in accord with the modern social principles of accident prevention. The maintenance of conditions conserving life and limb is a public duty and a responsibility of society. Here, too, the medical profession has a distinct contribution to make and it should be the first to appreciate its value and to correlate its experience with a view to establishing reliable figures.

By giving thought to this greatly neglected field of surgical sociology, it would be possible for the surgical fraternity to point out many of the shortcomings of our industrial system and to stimulate sound legislation designed to afford greater protection to industrial workers. Herein is a broad field for the surgical pioneer whose social mind can grasp his potential service to the community.

Book Reviews

A Text-Book of Fractures and Dislocations, With Special Reference to Their Pathology, Diagnosis and Treatment. By Kellogg Speed, S.B., M.D., F.A.C.S., Associate in Surgery, Northwestern University Medical School; Associate Surgeon, Mercy Hospital; Attending Surgeon, Cook County and Provident Hospitals, Chicago, Ill. Octavo; 888 pages; 656 illustrations. Philadelphia and New York: Lea & Febiger, 1916. Cloth, $6.00, net.

A perusal of this interesting volume, the latest work on fractures and dislocations, reveals two features that strongly commend it: the author has based it on a large personal experience, competently studied; he has conscientiously combed the literature of his subjects and included most of the important and useful contributions thereto. The work is, therefore, quite up-to-date and authoritative. It presents a third, and quite distinctive feature—a mechanical one: in place of the roentgenograms one expects to find in such a book today, some of which always are unsatisfactory, the author has illustrated it with admirable shaded tracings of actual roentgenograms, made under his supervision by Mr. Streedain. These are all clear, sharp and well executed and enhance both the appearance of the book and its teaching value. In the section on *pathological fracture*, however, it was a mistake, in our opinion, to substitute sketches for roentgenograms. These sketches cannot, certainly they do not, indicate those features by which, roentgenographically, medullary sarcoma, periosteal sarcoma, carcinoma, cyst, gumma, tuberculosis and pyogenic osteomyelitis can be differentiated.

Speed states that "syphilis itself rarely leads to pathological fracture. The bone changes are almost always hypertrophic in character, and shafts are greatly thickened." This is quite true, but it does not take into account the gumma which causes destruction as well as production of bone and thus occasionally produces a pathological fracture—more often, probably, than is generally believed, since the condition is apt to be mistaken for a neoplasm.

We are interested to note that Speed is one of the few who take issue with the teaching of older authorities that primary uncomplicated traumatic subluxation of the shoulder cannot occur. He has seen two cases (in one of which, however, he found on operation a slight mashing and overgrowth of the glenoid rim). But he is in error in stating that Stimson and Hamilton believe uncomplicated traumatic shoulder subluxation occurs; or perhaps the printer omitted the words "do not."

Not so much by way of criticism as to indicate the character of this work, it must be said that it appears (and perhaps was intended) to be more useful as a reference for the experienced practitioner than as a practical guide for the student and novice. The chapter on *symptoms, signs and diagnosis of fracture* is very brief and the section on diagnosis in general occupies less than two pages, one of which is devoted to roentgenography. Neither in this chapter nor elsewhere in the book is there any picture illustrating the method of examining an injured extremity, as for fracture or dislocation of the elbow. The scant section on plaster of Paris says not a word about the making and storing of plaster bandages—a most important matter—and neither in this section nor elsewhere is there a photograph to show what a good molded plaster splint or a good plaster cast should look like. Indeed, the book is strangely lacking in illustrations of splints, casts and other fracture apparatus—a serious defect, surely, from the standpoint of the inexperienced seeking practical information. Equally disappointing, from that standpoint, is the scarcity of photographs showing the deformity produced by various fractures and dislocations. In the text, too, clinical diagnosis might well have received more extended consideration. The mechanism of each fracture and dislocation is, however, carefully described.

Speed is an advocate of metal bone plating and of metal nailing. He presents a table of fracture cases operated upon at the Cook County Hospital and discharged during 1914 and the early part of 1915. We counted among these 42 Lane platings. Of these the "result as to function" was "perfect" in 1, "good" in 19, "fair" in 3, poor in 8 (non-union in 2; 2 "still discharging"), "recovery" in 2, not stated in 6 (1 left the hospital too early, 1 on crutches), died, 2. Nine of these 42 cases became infected. On their face these statistics do not seem to us to make a showing for metal plating that can arouse much enthusiasm. With nails and screws alone the results were better. Of 12 such operations the results were: "very good," 3; "good," 5; "fair," 2. In one case the nail was removed; result not stated. In one the result is given as "good."

Speed acknowledges the merits of Albee's methods, but his table does not indicate that they were much employed during that period of time.

The results of intramedullary splinting appear to have been, most of them, very good.

It is a pity that in a work in which so many authors are quoted their names are not included in the index. The failure to index them is a serious omission since it limits the usefulness of the work for reference purposes.

Such shortcomings as we have pointed out can be corrected in a later edition, and the excellence of this volume gives promise that a second edition will be needed.

Oral Surgery: A Treatise on the Diseases, Injuries and Malformations of the Mouth and Associated Parts. By Truman W. Brophy, M.D., D.D.S., LL.D., Sc.D., F.A.C.S., President and Professor of Oral Surgery, Chicago College of Dental Surgery; President International Dental Federation; Member American Medical Association, National Dental Association; Honorary Member of all National Dental Associations of Continental Europe, North America and Several Other Countries; Medalist, Odontological Societies of Paris and Italy, and of New York State Dental Society; Oral Surgeon to St. Joseph's, Michael Reese and Other Chicago Hospitals; Consulting Oral Surgeon, Presbyterian Hospital, etc. With special chapters by Matthew H. Cryer, M.D.; G. Hudson Makuen, M.D.; William J. Younger, M.D.; F. W. Belknap, M.D., and Calvin S. Case, M.D., D.D.S. Large octavo; 1000 pages; 909 illustrations, including 39 colored plates. Philadelphia: P. Blakiston's Sons & Co., 1915. Cloth $10.00 net.

This is a massive, indeed a monumental work. Few other men than Brophy are competent, by experience, to write it. It covers all the surgical affections of the mouth and jaws, the pharynx and the salivary system, and it covers them exhaustively and with voluminous references to the literature. How thoroughly these subjects are discussed may be gathered from the fact that of the more than one thousand large pages in this big volume only eighty are devoted to dental surgery (dento-alveolitis, extraction of teeth, transplantation of teeth). About sixty pages are devoted to harelip, and one hundred and seventy to cleft-palate, by his operation for which Brophy is best known. He also describes in detail other procedures than his, however, especially Lane's.

The work is remarkable in its completeness. It is, indeed, almost encyclopedic. As indicated above, some of the special chapters have been contributed by other writers.

The book might well have been reduced in size by condensing the first thirteen chapters (236 pages)—bacteriology, special infections, syphilis, tuberculosis, immunity, tumors, wounds, asepsis and antisepsis, anesthesia, injuries and diseases of blood vessels, fractures and dislocations in general, etc.—to a consideration of these subjects as applied to oral surgery. Thus, in the chapter on anesthesia, the historical paragraph is unnecessary and the paragraph on spinal anesthesia is out of place; a chapter on the diagnosis of oral syphilis would have been more appropriate than the sketchy chapter on syphilis in general; and of these other chapters, likewise, much might have been omitted that is to be found in text-books of general surgery. Brophy explains, however, that these chapters were written for the benefit of the dental student.

The illustrations, over 900, are very good. Many are borrowed from various sources. The others are radiograms, numerous photographs, and some excellent drawings by Zan D. Klopper. The colored drawings were a waste of money. Some of them are grotesque; all of them are unsatisfactory.

It was in 1886 that Brophy was appointed by the National Association of Dental Faculties to write a book on oral surgery. During the thirty years that have elapsed he has been accumulating the illustrations, the experience and the wisdom that is in this treatise; and we may be grateful, indeed, that he took ample time in the preparation of so important a work.

Manual of Operative Surgery. By John Fairbairn Binnie, A.M., C.M. (Aberdeen), F.A.C.S., Surgeon to the Christian Church, German and General Hospitals, Kansas City, Mo.; Fellow of the American Surgical Association; Membre de Société Internationale de Chirurgie. *Seventh Edition*, revised and enlarged. Large octavo; 1363 pages; 1597 illustrations, some in colors. Philadelphia: P. Blakiston's Son & Co., 1916. Cloth, $7.50.

In the dozen years Binnie's Operative Surgery has been before the profession, first as a very small, incomplete manual, it has grown steadily in size and in importance, until it has become as nearly indispensable a reference work as such a book can be. From the outset it has been Binnie's plan to deal especially with the more unusual operations, thus to afford much information not to be found in most text-books of operative surgery and, as the author puts it, "to give aid to the surgeon when he is in trouble." While he has not by any means neglected the classical and the "every day" operations, Binnie has continued to emphasize the rarer procedures, and his work is accordingly distinctive. It is, moreover, precise and painstaking in description and, it seems to us, altogether sound and reliable.

Comparison with the sixth edition shows a general, conscientious revision and the inclusion of the most important newer operations and operative methods. In the new section on indirect transfusion of blood, however, there is no reference to the methods of Lewisohn (citration) and of Unger, which are the simplest of all. The new section on cardiac surgery is quite brief. Rather brief, too, for a work of this character, are the sections on other intrathoracic operations, the technics of which, however, are still in the making.

There is an interesting Appendix on War Surgery by Walter S. Sutton.

The index is very full, occupying nearly fifty pages, but is not over-elaborated. It contains, however, many typographical errors.

A Manual of Gynecology and Pelvic Surgery for Students and Practioners. By Roland E. Skeel, A.M., M.D., Associate Clinical Professor of Gynecology, Medical School of Western Reserve University; Visiting Surgeon and Gynecologist to St. Luke's Hospital, Cleveland, etc. Duodecimo; 680 pages; 289 illustrations. Philadelphia: P. Blakiston's Son & Co., 1916. $3.00 net.

This is a very handy and attractive manual, and has several features to commend it. As one reads through its pages, one is struck by familiar subjects, those which came up for consideration in daily practice. Especial attention is given the matters of diagnosis and treatment. Ample illustrations serve to make the text clearer, while the latter is itself concise and clear. A rather extensive bibliography is appended to each chapter. No attempt has been made to correlate in the text references in medical literature with their particular content. Nor is the list of authors complete; it lacks a number of very important ones. Yet for the reader who is interested in further studying a given chapter in gynecology the bibliography may serve as a good working reference.

In the matter of pathology the book has not been so fortunate. The photomicrographs are not well chosen as types of disease, nor are they up to date. The picture of interstitial endometritis, for example, shows an unmistakable status premenstrualis which is not at all suggested in the description. Gynecologic pathology has made many strides in the past decade, particularly in cyclical changes of the endometrium, and it behooves authors of new text-books to be at least familiar with the more important ones.

Surgery in War. By Alfred J. Hull, F.R.C.S., Major, Royal Army Medical Corps, Surgeon British Expeditionary Force in France; Late Lecturer on Surgical Pathology, Royal Army Medical College, Millbank, etc. With a preface by Sir Alfred Keogh, K.C.B., M.D., Hon. Physician to H. M. the King. Duodecimo; 405 pages; 26 plates and 55 text figures. Philadelphia: P. Blakiston's Sons & Company, 1916.

This small manual is an interesting presentation, in a condensed form, of the treatment of war injuries, as elaborated by Sir Almoth E. Wright and others of the British Army Medical Corps. Several of the chapters are contributed by authors other than Hull.

Practical Dietetics with Reference to Diet in Disease By Alida Frances Pattee, Late Instructor in Dietetics, Bellevue Training Schools for Nurses, Bellevue Hospital, New York City; Former Instructor at Mount Sinai, Hahnemann, and The Flower Hospital Training Schools for Nurses, New York City; Lakeside, St. Mary's Trinity and Wisconsin Training School for Nurses, Milwaukee, Wis.; St. Joseph's Hospital, Chicago, Ill.; St. Vincent de Paul Hospital, Brockville, Ontario, Canada. *Tenth Edition*, revised and enlarged. Duodecimo; 466 pages and two indices. Mt. Vernon, N. Y. A. F. Pattee, 1916. $1.50.

This familiar and excellent book needs no further description. This edition shows various changes, the section on infant feeding, especially, having been largely rewritten and expanded. It is a bit amusing that chapter 23, devoted to the diet of the adolescent and the aged, should also bear the running head "Infant Feeding."

The Influence of Joy. By George Van Ness Dearborn, Instructor in Psychology and Education, Sargent Normal School, Cambridge; Psychologist and Physiologist to the Forsyth Dental Infirmary for Children, Boston, etc. Edited by H. Addington Bruce, A.M. *Mind and Health Series.* Duodecimo; 223 pages. Boston: Little, Brown & Company, 1916.

Though adding nothing new to James's psychology of the emotions, this volume serves to emphasize their physiological side, showing that joy makes for health and achievement.

Progress in Surgery

A Résumé of Recent Literature.

Spasm of the Stomach and Duodenum from a Roentgenologic Point of View.

R. D. CARMAN, Rochester, Minn. *Journal of the American Medical Association*, April 22, 1916.

The stomach is the favorite playground of spasms, either of intrinsic or extrinsic origin. The intrinsically caused spasms are generally due to ulcer, less often to cancer, and three forms due to the former cause may be distinguished, namely: (1) the incisura or hour-glass stomach; (2) diffuse spastic distortion, and (3) spasm of the pyloric sphincter. These are described as regards their appearance under the rays. Cancer may also produce more or less spastic distortion aside from its filling defect due to the tumor mass, and some of these may resemble that from ulcer. Duodenal ulcer is occasionally associated with gastric incisura or hour-glass stomach and a spastic filling defect of extrinsic origin in the pyloric end of the stomach is equally misleading. Pylorospasm due to diseased gallbladder or appendix is also noted, and extrinsic spasm may be total instead of localized, giving a contracted tense and inactive organ with little secretion as a rule. The causative agents of extrinsic gastric spasm are hard to prove definitely and as probable causes are enumerated hysteria, pancreatic disease, tabes, abdominal arteriosclerosis, calculi, uremia, and poisoning by lead, nicotin and morphin. A condition like gastrospasm may be produced in emotional disturbances by strong retraction of the abdominal wall and relieved when the fear or nervousness has disappeared. The diagnosis of gastrospasm from organic disease is best carried out by exclusion. If due to organic lesion the deformity is persistent, localized and unvarying. Sometimes a palpable mass from a new growth may be detected and if the lumen near the pylorus is markedly encroached on by an organic lesion obstruction will be shown to a six-hour meal. Spasm resulting directly from an ulcer or cancer is usually seen in the segment involved. Intrinsic spasm tends to persist at subsequent examinations and is unaffected by antispasmodics. Indirect, remotely caused gastrospasm is often brief in duration or intermittent, and may show changing aspects. Diffuse extrinsic spasm tends to accelerate gastric motility rather than retard it and remotely reflected spasm is likely to be missing at any second examination and disappear with the use of an antispasmodic. These rules are not absolutely inflexible, but serve in a general way. Carman has had the best results from giving belladonna tincture, from 15 to 20 drops three times daily for three or two days, and then re-examining. The physiologic effects of the dose are necessary for the examination to be conclusive. General anesthesia causes any form of spasm to disappear. In the duodenum a probable form of intrinsic spasm not hitherto emphasized is that accompanying duodenal ulcer. Deformity of the bulb has generally been attributed to the ulcer or its scar, but Carman mentions the following phenomena as deserving consideration: "1. In those cases in which organic distortion is present, the deformity noted at the Roentgen examination often far exceeds the deformity found at operation. 2. Cases are seen occasionally in which the ulcer or its scar as found at operation is small and quite insufficient of itself to produce a recognizable filling defect in the roentgenogram. This fact made us very skeptical for some time of the validity of Cole's sign. However, these cases do frequently show pronounced irregularity of the bulbar shadow, and this must be due to some cause other than the organic alteration of the bulbar wall. 3. In the above described type, on plates made in the dorsoventral position, the disfigurement is seen on the lateral borders of the bulb, although the ulcer is usually situated on the anterior wall. 4. The bulbar distortion often displays other characteristics of spasm. It is clean-cut in outline, projects deeply into the bulbar lumen, and is wholly comparable to the incisura of gastric ulcer. 5. That duodenal ulcer, like other ulcers, is an efficient spasm-producing agent is indicated by its association with spasm in the stomach and elsewhere."

Experimental Studies in the Production of Chronic Gastric Ulcer.

A. O. WILENSKY and S. GEIST, New York. *Journal of the American Medical Association*, April 29, 1916.

Wilensky and Geist report experimental studies on the production of chronic gastric ulcer in cats after first studying the healing of surgical injuries in a number of the animals. They found that the surgical lesions healed completely in from one to two weeks and the contraction of the stomach wall tended to make the defect smaller. In their experimental production of gastric ulcer the abdomen was opened in the middle line, the stomach pulled out and an incision into it made parallel to and near the major curvature so as to enable one to evert the mucous membrane along the lesser curvature. The defects were made by excising tissue of the stomach wall down to and including part of the muscularis and measured from 1 to 2 cm. in diameter. The bacteria used were injected into the tissue layers and were obtained from cultures of human gastric ulcer excised in operations. The animals were returned to cages and fed much as usual and ate freely in from twenty to forty-eight hours, not losing weight appreciably. The stomachs were inspected at various periods afterward and it was found that the surgical defects healed as promptly in the injected animals as in the controls. Their experiments, they say, demonstrate that the presence of organisms (streptococci), taken from human gastric ulcers has no effect in producing in cats defects with characteristics of the chronic indurated ulcer of man or in retarding the healing of the injected lesions.

The Antiseptic Action of Ether in Peritoneal Infections.

J. SALIBA, Elizabeth City, N. C. *Journal of the American Medical Association*, April 22, 1916.

Saliba reports his experience with the use of ether in peritoneal infections. When introduced into the peritoneal cavity it acts in both its liquid and its gaseous form, and its absorption and evaporation are very rapid. He has used it as a routine in all cases of peritoneal infection that came under his care for over a year at the Elizabeth City Hospital, continuing the employment of proctoclysis and Fowler's position in the after-treatment. By means of small sterile canula attached to a record syringe containing the dose of ether and inserted immediately before the continuous suture of the peritoneum has been tied, he instils the ether into the peritoneal cavity and then sutures the wound in the parietes. When drainage is used, he injects ether through the drainage tube and clamps it for four hours. His youngest patient thus treated was five years old and the amount injected 1 ounce. In adult cases he never injects more than 3 ounces and in only one case did he give a second injection on the fourth day. No untoward after-effects of the ether were observed in any of his cases. Five cases of appendicitis showing the results are reported. He concludes that ether has a bactericidal action and is a safe and beneficial antiseptic in peritoneal infections. Any possible toxic action of the ether is very slight.

Penetrating Wounds of the Abdomen.

J. FRASER and H. T. BAKER. *British Medical Journal*, April 8, 1916.

The observations are based on a large experience at the front. The authors are convinced that in the vast majority of penetrating wounds of the abdomen operation is necessary. It is only in the rarest instances of injury to the hollow viscera that spontaneous recovery occurs. The only pre-operation treatment the authors give is to keep the patient warm and administering 1 c.c. of pituitary extract. During the operation saline solution is given subcutaneously. The closed ether method of anesthesia, in the authors' opinion, gives the least shock. The authors describe their method of exploration, which does not differ from that conventionally employed. Speed is an important factor

Final Results in Twelve Cases of Colectomy. John G. Clark, Philadelphia. *Surgery, Gynecology and Obstetrics*, May, 1916.

In only 6 of the 12 cases operated upon by Clark may one consider the resutls as entirely satisfactory. In all cases there was great improvement of the constipation for a time, to be followed at variable intervals in four by a gradual recurrence of the constipation. In some cases this has not been so severe as formerly, whereas in others it is quite as intense. *X*-ray examinations in three cases showed in two decided dilatation of the ileum to a size closely resembling that of the colon. None of these cases showed diarrhea of long standing, and in all this could be controlled by simple medicinal measures. Thirst has not been undue in degree in any of these cases. In six cases the general nutrition was markedly improved. In the remainder there was no visible effect so far as physical improvement is concerned.

The author feels as a final summary of these cases that total removal of the colon is justifiable only in severe cases of obstructive constipation. The immediate danger of the operation and the serious sequelae that may follow weeks or months later make it, however, too hazardous to extend it into the wider fields so ardently advocated by Lane and his enthusiastic followers. It may be efficacious if carefully restricted, but it possesses no miraculous function. The ileum does not uniformly assume the vicarious function of the colon; in a definite proportion of cases the backward pressure from the colon through the anastamotic opening when it is low down causes dilatation and permanent impairment of the ileum.

A Clinical Contribution to the Evaluation of Occult Blood in Stomach Contents and Stool in the Diagnosis of Stomach Carcinoma. (*Ein klinischer Beitrag zur Bewertung des Nachweises okkulten Blutes in Mageninhalt und Stuhl für die Diagnose des Magenkarzinoms.*) Josef Emmert, *Münchener Medizinische Wochenschrift*, March 7, 1916.

In 21 cases of carcinoma ventriculi, the positive finding of blood in the stool and gastric contents exceeds in frequency all other signs of carcinoma; only in one case was this not true. This symptom is comparatively early and is probably present when the patient consults the physician for stomach symptoms. In one instance the guaiac test proved positive when symptoms had lasted altogether only four weeks. At operation an area of cancerous involvement the size of a silver dollar was found. Since the finding of blood in gastric contents is constant in cases of carcinoma ventriculi, a single negative finding with the guaiac test would make the diagnosis of a stomach cancer highly improbable. In the 20 cases there never was a single instance in which the text was negative. And this is true after operation even when a wide gastroenterostomy had been made and strict regulations of the diet practiced.

A Preliminary Report Concerning the Effect of Foreign Substances in the Peritoneal Cavity. William R. Cubbins and Joseph A. Abt, *Surgery, Gynecology and Obstetrics*, May, 1916.

The authors tested the value of certain substances in the prevention of peritoneal adhesions. They found that the tincture of iodine, sulphuric ether, commercial vaseline, liquid albolene, white vaseline, Russian mineral oil, olive oil, almond oil and lanolin were all useless in the prevention of adhesions. While some of these substances, as sulphuric ether and the tincture of iodine, were highly toxic and lethal for the dogs, the others were all irritants resulting in more or less extensive, more or less coarse or fine adhesions within the peritoneal cavity. Liquid paraffin is relatively non-absorbable, being retained in its original state for varying periods; but it will not prevent adhesions.

Free Transplantation of Fascia Lata in the Treatment of Inguinal Hernia. By Francis T. Stewart, Philadelphia. *Pennsylvania Medical Journal*, April, 1916.

In dealing with an indirect hernia the cremasteric fascia and the infundibuliform fascia are incised in the axis of the spermatic cord, the sac isolated, ligated and excised; and its stump transferred and fastened to the under surface of the transversalis fascia, above and to the outer side of the internal inguinal ring, by passing one end of the ligature through the fascia and the muscles at this point. The edges of the transversalis fascia are seized with forceps and everted. When the hernia is large the transversalis fascia in the neighborhood of the internal ring above the cord is often so attenuated as to be difficult of recognition; in these cases it may be traced from the lower margin of the ring, which can always be felt as a sharp band below the cord. The size of the transplant required is now estimated, the lower margin of the cutaneous incision undermined, and the transplant excised from the fascia lata below Poupart's ligament, between the external cutaneous nerve and the branches of the anterior crural nerve. The transplant is immediately sutured with catgut to the under surface of the everted margins of the transversalis fascia; *i. e.*, the everted margins of the internal ring above the cord. The edges of the transversalis fascia are then united over the transplant.

When the hernia is a direct one the cremasteric fascia is incised to the inner side of the cord, the transversalis fascia in Hesselbach's triangle opened, and the peritoneal sac removed, the stump of the sac being fastened to the under surface of the transversalis fascia above and to the inner side of the triangle. The transplant is then sutured to the under surface of the transversalis fascia, which is subsequently overlapped.

A Report of a Series of Unusual Fecal and Genito-Urinary Cases Treated with Bismuth Paste. Emil G. Beck, Chicago. *Surgery, Gynecology and Obstetrics*, May, 1916.

Beck reports a series of cases of fecal and genito-urinary fistulæ of the most complicated variety that previously failed of healing though several attempts at surgical closure were made. By injections of bismuth paste in various concentrations at least 65 per cent. of these fistulæ may be made to heal. The bismuth paste forms an aseptic coating to the fistulous tract, protects the granulations from the infective material, and permits the fistula to fill in and close up. The best results are obtained by injecting the paste into every crevice and ramification of the fistulæ. Frequently surprising pictures are presented in the roentgenogram, resulting in the detection of the underlying diseased focus in a remote organ or region of the body. Thus one case of supposed rectal fistula proved to be an abscess resulting from tuberculosis of the eleventh dorsal vertebra.

In only one class of sinuses must great care be taken not to inject too large a quantity of the paste, and that is into large pus pockets where the bismuth may remain a long time and cause poisoning by absorption. Of a series of 1,800 cases, Beck has not had a single fatality resulting from bismuth injection. Where poisoning is feared the fistulæ should be filled with *warm olive oil* so as to make a bismuth emulsion. This is left in for 12 to 24 hours and then withdrawn by means of a catheter or suction syringe. Tuberculous fistulæ yield in a remarkable way to this method of treatment and sometimes as the result of several injections.

The Advantages of Pyelotomy in Renal Calculus. H. Magrand, Grenoble, France. *New York Medical Journal*, April 29, 1916.

For a long time it was believed that pyelotomy predisposed to the formation of a fistula, but Magrand shows by statistics that this is not so. If a fistula develops, it is due to an obstruction of the ureter. Magrand says that pyelotomy has three advantages over nephrotomy: 1. Calculi, especially the coral-shaped ones, can be more easily removed and the pelvis of the kidney can be more thoroughly explored. 2. The dangers of primary and secondary hemorrhage are less. 3. The parenchyma of the organ is not injured, lessening the danger of decreased function. According to Magrand, the latter has been not infrequently observed, both in experimental and operative nephrotomies.

Prostatectomy Under Local Anesthesia.

A. E. Hertzler, Kansas City. *Journal of the American Medical Association,* April 29, 1916.

Hertzler speaks of the difficulties of the choice of anesthesia in prostatic operations. A general anesthetic may be used when the patient is in good condition, but in many of those cases in which the bladder and lung is affected it increases the hazard, hence a local anesthetic and two-stage operation come into play. When a local anesthesia fails, as it does sometimes, and it is necessary to shift to a general anesthesia, the patient suffers pain and those patients bear the change badly. While he recommends local anesthesia only guardedly in prostatectomy in his recent book on local anesthesia, he has been working out a combined technic which he thinks should be successful. Under the local anesthesia the easiest operation is the suprapubic and the operation of election, according to his experience, is performed with a combination of sacral blocking and direct prostatic infiltration through a suprapubic wound made at the time of operation or as a preliminary operation some days before. The reason that sacral anesthesia cannot be relied on is its uncertainty. He gives the details of his technic of combined sacral and local anesthesia rather fully. All that is demanded of the sacral anesthesia is that the lifting of the prostate with the attendant traction on the paraprostatic tissues shall be possible without pain. Complete anesthesia of the sacral plexus is not necessary. The only untoward effect he has noted is the temporary anesthetization of the sciatic nerves. This is unimportant, however, in prostatic operations, for the patient is recumbent and kept so. It is only in operations in which the patient wants to go about his business at once that such results are embarrassing. He has only noticed it with novocain, and quinin and urea hydrochlorid can be used with satistion in all stages of the operation.

Laminectomies Under Local, Not Spinal Anesthesia.

A. C. Strachauer, M.D., Minneapolis. *The Journal-Lancet,* February 15, 1916.

Laminectomies were performed successfully, absolutely painlessly, and free from shock or by-effects. The operations were practically bloodless, which in this class of work is of the greatest advantage. The writer was so impressed by the angiospastic effect of the suprarenalin that he would advise the injection of an adrenalin solution even when the laminectomy is to be performed under general anesthesia. Krause, Horsley, Cushing, Elsberg, and other neurologic surgeons all comment on the profuseness of hemorrhage in laminectomies, which is frequently so great as to necessitate the abandonment of the operation, or its performance in two stages. Shock and hemorrhage are the causes of death in laminectomy, and both factors are reduced to a minimum by the plan of operation, as outlined.

Local anesthesia is not to be employed promiscuously. Scrupulous attention to details in both the preparation and the employment of anesthetic solutions is essential to success and to the avoidance of disaster. The operator using local anesthesia must be qualified to know its technic, indications and limitations, in this regard sharing the technical experience of surgery in general.

The writer prefers general anesthesia in major surgery, but believes that there is a large field in which local anesthesia is infinitely superior, and is indicated.

Spina Bifida in the New-Born.

James A. Harrar, *Bulletin of the Lying-in Hospital,* New York, April, 1916.

Of 91,600 confinements in the Lying-in Hospital at or near term, spina bifida occurred 59 times. As 9 cases were sent in from various outside sources for operation, the total number reported is 68 cases. Harrar's experience with this class of new-born infants makes him predicate a very dismal prognosis as to useful function and as to life. The great majority have died within the first few weeks of life from a progressive hydrocephalus. Thirty were treated without operation. Of these all but one, a simple meningocele, died within a few weeks. Of 31 cases which were operated upon for radical cure of the rachocele 18 died within from one to twenty-one days of meningitis, encephalitis and general infection. While in 13 cases there was a successful solid scar, 9 of these died within a period of one to eight weeks from increasing hydrocephalus. The remaining four were discharged, but Harrar observes that it is doubtful whether they are still living. The associated congenital abnormalities, chiefly hydrocephalus, spastic and complete flaccid paralysis of the legs, talipes equinus, sphincter paralysis, imperforated anus, iniencephaly, gastroschisis and anencephaly complicate the prognosis seriously.

The contraindications to operation for this condition are: 1. Demonstrable evidence of hydrocephalus. 2. Paralysis of legs or sphincters (except of the slightest degree). 3. The defect so extensive as to preclude securing of good flaps without tension.

The Surgical Significance and Operative Treatment of Enlarged and Varicose Veins of the Spinal Cord.

C. A. Elsberg, New York. *American Journal of Medical Sciences,* May, 1916.

In a series of 130 laminectomies Elsberg found in six instances one or several enlarged veins on the posterior surface of the cord. All of the patients had the signs and symptoms of a level lesion and the greatest or only enlargement of the vein was found at the part of the cord which corresponded with the symptoms. Two of the patients suffered from root pains. In all of the patients the left posterior spinal vein was enlarged. Whether the enlargement was primary or secondary to some disease of the cord, Elsberg cannot say with certainty. In all instances Elsberg ligated and removed as much of the enlargement as possible. In two patients the condition was unchanged after operation. One patient, who had a tuberculoma of the cord, improved greatly, but the improvement may have been due to the removal of the tuberculoma. One patient with severe root pains was entirely relieved. Two patients with cord symptoms improved markedly; one of the patients completely.

Open-Air Treatment in Surgery.

J. W. Markoe. *Bulletin of the Lying-in Hospital,* New York, April, 1916.

Markoe advocates open-air treatment of septic cases, operated or unoperated, and also of desperate obstetric cases to tide them over their acute crisis. In a number of cases by placing such patients on the roof with enforced feeding and hematinics he has succeeded in improving their resistance, and in increasing the hemoglobin index to such a degree as to be able to carry them through very serious complications. The method of Rollier, that is of gradual and systematic exposure of various parts of the body to the actinic rays, is the one employed.

A Plea for Open Wound Treatment.

(*Für die offene Wundbehondlung.*) C. V. Wild, *Muenchener Medizinische Wochenschrift,* February 29, 1916.

The method of open treatment of wounds is an old one, yet it has not been systematically carried out. V. Wild, who recommended this method at the outbreak of the present European war, is now more firmly convinced than ever of the great value of the open method of treating wounds. The advantages are, the avoidance of motion of limbs and of joints; the avoidance and economy of changing bandages with the attendant secondary infections; the doing away with stagnation and retention and the foul odors in the military hospitals. Surface wounds are not permitted to lie in horizontal posture; they are elevated so that the secretions may gravitate downward; gauze is so placed below the lower wound margin as to catch the secretions, and may be changed as often as necessary without touching the wound. Wound cavities should first be so split up as to facilitate free drainage, wide rubber or glass tubes being placed in the angles of the wound to drain off the secretions. Joint wounds are thus especially to be treated. The part is to be kept perfectly quiet and protected against trauma and against flies and contamination by a sieve-frame or aluminum splint over which a thin layer of gauze may be wound

In joint and bone fractures splints are to be applied with fenestrations for the exposure of the wound entrance and exit and proper drainage provided.

The greatest benefit of this treatment is the comfort that comes to the patient by not disturbing him at stated intervals. In extensive injuries to bones and joints where bandages were formerly used, one is sometimes tempted to postpone changing the dressing because of the pain and discomfort to the patient. In such case the odor becomes almost intolerable. The open treatment of wounds obviates this difficulty.

A Case of Bacillus Aerogenes Capsulatus Sepsis.

Meyer Rosensohn, *Bulletin of the Lying-in Hospital*, New York, April, 1916.

The patient was a para—1, age 29, who suffered from labor pains for five days before admission to the hospital. She came in in shock with subnormal temperature. There was almost general emphysema. Inasmuch as rupture of the lung could be excluded by physical examination the presumptive diagnosis was an infection due to the aerogenes capsulatus bacillus. Blood culture one hour prior to the patient's death proved this diagnosis to be correct. The child had been dead for some days before it was delivered by extraction. There had been a rupture of the fundus of the uterus and the child was bloated and twice the size of the average child at birth, due to the emphysematous condition.

Amputations at Base Hospitals in France.

C. G. Watson, France. *British Medical Journal*, April 1, 1916.

Watson believes that the method of choice in cases of gas bacillus infection of the limbs is the flush or flapless operation. He believes that it is a life-saving measure, because it affords adequate drainage to the infected tissues and can be performed with a minimum risk of shock. Amputations for other conditions than gas bacillus infection are rarely necessary at the base hospitals.

Autografts in Infected Fields.

Arthur Ayer Law, M.D., Minneapolis. *The Journal-Lancet*, April 1, 1916.

From laboratory studies and from numerous cases cited the author concludes that while their exhibition in any but clean fields as a general surgical procedure is not orthodox, auto transplants, on account of their tolerance for mild infection, are not only permissible but advisable in instances of established immunity and where the need is great.

Autogenous bone grafts in infected fields parallel and act much as do cases of osteomyelitis. Part of the graft survives and proliferates, part is absorbed, and part sequestrates. The graft is itself osteogenetic and is responsible for the formation of a sequestrum and involucrum.

Gunshot Wounds of the Thorax.

W. M. Boothby, Boston. *Boston Medical and Surgical Journal*, March 16, 1916.

1. Intrathoracic hemorrhage is most likely to cease with the patient at absolute rest; therefore he should be kept in bed (under morphia, if necessary) at the first available station.
2. Symptoms rapidly developing, suggesting pneumonia with marked dyspnea, are probably due to the production of a large hemothorax or a pneumo-hemothorax. Such cases should be aspirated and sufficient fluid withdrawn to relieve the dyspnea. Care should be taken not to produce a negative pressure within the thorax by the use of an aspirating bottle. A simple needle with rubber tube 30 cm. long, filled with sterile water, and the open end immersed in a basin of sterile water, will produce as great a suction as it is safe to use. With such an apparatus, as much fluid can be withdrawn as will run out of its own accord.
3. After three days the danger of infection exceeds that of hemorrhage. Therefore, if the patient is not in a place equipped for diagnosing and operating for empyema, he should be evacuated to the nearest hospital so equipped, and kept there for at least two weeks before further evacuation.
4. Whenever the patient presents an irregularly elevated temperature, exploratory aspiration with a small syringe, armed with a long needle of large bore, should be performed.
5. Whenever the pleural fluid is found infected, a long thoractomy opening should be made and free drainage instituted.
6. If the patient is in a dangerous condition, prolonged search for the presence of a foreign body should be deferred. However, all foreign matter should be removed as soon as possible in order to hasten the final closing of the wound.

After Results of Tonsillectomy: A Study of 572 Cases.

J. S. Simpson, Morristown, Pa. *Journal of the American Medical Association*, April 1, 1916.

From a study of 571 operations of removal of the tonsils and adenoids in the boys at Girard College, Philadelphia, Simpson summarizes as follows: "1. Of 320 sufferers from sore throat, 205, or 64.06 per cent., were relieved. 2. Of 571 examined, 255, or 44.75 per cent., still had tonsillar tissue present. 3. Of 195 mouth breathers, 114, or 58.46 per cent., were relieved. 4. Of 571 questioned, 400, or 70.05 per cent., felt their health to have been improved. 5. Of 48 who had diseases of the ear or impairment of hearing, 37, or 77.08 per cent., were finally relieved. 6. Of 45 studied, 25, or 55.5 per cent., gave an increase in scholarship of 4.45 per cent., while 20, or 44.5 per cent., gave an average decrease of 6.09 per cent. 7. Of 46 subject to enuresis, 25, or 54:35 per cent., ceased to offend. 8. Of 33 tested, the voices of 32 were improved. 9. One-third of the patients in a scarlet fever outbreak, and one-fourth in a diphtheria series had been operated on before the attack. One boy already operated on became a diphtheria carrier."

Blood Changes Following Mesothoriumirradiation.

(*Veränderungen am Blute nach Mesothoriumbehandlung.*) Bernhard Schweitzer, *Münchener, Medizinische Wochenschrift*, March 7, 1916.

The erythrocytes are practically unaffected by deep-ray-therapy with mesothorium, nor is the hemoglobin directly influenced. Indirectly through the inhibitory action upon the cancer the hemoglobin and red blood cells are increased. There is an initial rise in the number of leucocytes, which, however, is of very short duration. This is followed by a definite leucopenia which affects the lymphocytes as well as the neutrophiles. The lymphocytes do not participate in the initial leucocytosis. Some eight weeks after the last mesothorium treatment the number of leucocytes approaches the normal count.

Schweitzer remarks that inasmuch as the neutrophiles are the phagocytes and as such the carriers of antitoxins and bactericidal substances, the body must miss these defensive agencies in case of systemic infection. Hence this must be considered in treatment by mesothorium. Bone-marrow is also injured by the mesothorium. The "Röntgenkate," in his opinion, may be due to the deleterious effect on the blood itself.

The Treatment of Joint Rheumatism by Intravenous Injection of Collargol.

Dr. Wick, *Muenchener Medizinische Wochenschrift*, No. 10, March 7, 1916.

Wick reports a case of simultaneous knee and foot rheumatism in a patient who had besides rheumatic symptoms in the back and loin. Three injections of 2 c.c. of 2 per cent. collargol into the median cubital vein were made at intervals of 3 days. There followed upon each injection a chill and elevation of temperature. This lasted only a few hours and was soon replaced by decided improvement in the local symptoms. The second injection was followed by a less severe reaction than the first, and the third injection by a very mild general reaction. Within twelve days the patient was able to use his limb without difficulty and without pain.

The author encourages others to try this method of treatment, as in his opinion it might prove of value in obstinate cases.

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THE METHODS OF CHAMPIONNIÉRE AND OF BARDENHEUER IN THE TREATMENT OF FRACTURES.

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During the past five years, the rich fracture material of the Los Angeles County Hospital, averaging at present 50 patients daily, has given us opportunity to try out some methods of fracture treatment under more favorable conditions than usually obtain, and I think it may be of interest to discuss some of the work we are doing. I am not able to give statistics of the number of cases treated, nor of the results obtained, but only impressions as to the value of the methods tried.

It has been our rule to limit the operative treatment of recent closed fractures to those in which we could not obtain by other means an apposition of the fragments sufficiently accurate to assure good function. When other means have failed to secure such apposition, we have not hesitated to use the open method, but in the main we have striven to improve our bloodless methods rather than to increase the number of our operative cases.

The purpose of this paper is to call attention to two methods with which we have had considerable experience, and which we believe to be a real advance in fracture treatment. I refer to the methods of Championniére and of Bardenheuer. Differing wholly in their technic, the methods of these two men have in common the substitution of mobilization for the time-honored tradition of immobilization in the treatment of fractures, and they have demonstrated by thousands of cases the fact that immobilization is not only unnecessary for the formation and consolidation of callus, but positively harmful in its effects upon the fractured limb. They have demonstrated that it is possible to preserve the function of the injured limb during the process of healing of its fractured bone without interfering with, indeed, promoting, that union.

In no field of surgery is greater experience and greater ingenuity required than in the treatment of fractures. Each case requires for its management a consideration of its own peculiarities, and the adoption of such treatment as will best meet its individual needs. There is no set rule adapted to all cases. It is as ridiculous to say that all fractures require operation as to say that none requires it. The successful management of a fracture requires a knowledge of many methods, and the selection of that one which in the individual case will lead to a restoration of the form and function of the injured limb in the shortest time possible, and with the least danger and inconvenience to the patient. It is not alone necessary that the form of the bone shall be restored as near as possible to the normal, it is necessary to accomplish this in such manner that the function of the limb may be restored, and with the least possible delay. We must remember that a fracture is an injury, not to a bone alone, but to a limb, and it is a mistake to concentrate our attention upon the bone in disregard of the soft parts. Only to a certain extent is it true that function depends upon anatomical restitution of the bone. It is a matter of common knowledge that perfect apposition of the fragments may be attained and yet the means employed for their retention may result in such damage to the soft parts and joints that function is never recovered.

The converse is equally true, that very faulty apposition may be compatible with perfect function, provided the integrity of the soft parts and joints is preserved. If, in order to secure accurate apposition, such means must be adopted as will endanger the integrity of the limb or impair the usefulness of its soft parts, we must desist from such measures and adopt such form of treatment as will conserve the function at the expense of some bony deformity.

The advent of the *x*-ray into the treatment of fractures has not been an unmixed blessing, for it has served so to fix attention upon the bone alone that the severity of the injury, and the result of treatment, are judged solely by the radiograph. The criterion of successful treatment is function and that cannot be displayed in the *x*-ray picture. No one would dare prognosticate the usefulness of an injured limb from an inspection of its radiograph alone. If the plane of the articular surface of the bone is maintained in its normal relations, a perfect function may be secured even with an atrocious radiographic finding, and, in some joints, even this is not necessary, as witness the usefulness of many a wrist with gross deformity of the lower end of the radius.

I am far from decrying the desirability of securing a reasonable approximation of the fragments, but I am convinced that this should not be the sole object of treatment, nor should our success be judged solely by the degree of its accomplishment.

Not only should function be the main object of treatment, but that function should be restored in the shortest time possible. The time element has not been given the consideration which it deserves in the choice of our methods of treatment. The present tendency toward universal insurance of labor, growing out of our recently enacted employers' liability laws, obligates us to give greater heed to the element of time in the recovery from fractures. This is a matter of great economic importance, for, if but a few days can be saved from each fracture, by the selection of its form of treatment, the saving becomes in the aggregate an amount of enormous value.

The element of danger must enter into our consideration, from both a social and an economic standpoint, for, aside from the shock to our sensibilities occasioned by a death from the treatment of an injury, itself not dangerous to life, we must consider the enormous economic waste of a life cut off in its prime.

The element of convenience is a less important matter, but still worthy of consideration, for the alleviation of pain is an important function of the surgeon.

The length of disability occasioned by a fracture ordinarily consists of two elements, the time required for union of the bone, and the time required for restoration of the function of the soft parts. The union of the bone may be influenced by treatment insofar as close approximation favors early union, and increase of nourishment favors bone formation, but the greatest opportunity for the saving of time is offered in the restoration of the function of the soft parts. With our older belief in the necessity of firm immobilization of the fragments, for the formation and consolidation of callus, it was essential that restoration of function be delayed until union of the bone had occurred.

With the absolute overthrow of this belief has come the greatest advance in fracture treatment. If we can conserve the function of the limb during the healing of the fractured bone, we may shorten the process of repair enormously. If by our treatment we can hasten the repair of the bone, while maintaining the function of the injured limb, and, if we can accomplish this purpose with absolute relief of pain and without any danger to the life of our patient, we have reached the acme of fracture treatment.

In certain forms of fracture this ideal is reached by the method of Championniére.

The essential element of this treatment is mobilization, which is begun by active movements of the limb, immediately after the injury and continued until its complete recovery.

To render active movements possible it is necessary to make them painless, and this is accomplished by massage and passive movements.

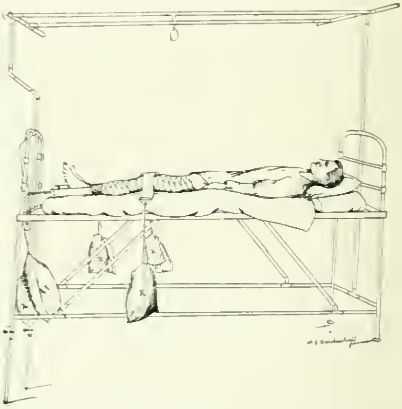

Fig. I.—Longitudinal and lateral pulls in fracture through the tuberosities of the tibia with lateral luxation of the knee.

It is possible by massage to so anesthetize a fractured limb that passive and then active movements may be commenced immediately after the injury. It is surprising to what extent this may be accomplished even in sensitive and nervous patients.

The greatest pain in a fractured limb is caused by the muscular contractions and the strain of holding the limb in a fixed position. Massage and passive movement relax the muscles and relieve the tension, and the patient finds, to his surprise, that active movements are possible, not only without pain, but with the greatest relief.

The massage which accomplishes this really astonishing result is not that used by the professional masseur, but is a very gentle stroking massage, so light at first as to be scarcely perceptible to the patient. So light and gentle must it be that no pain whatever is produced. Pain defeats the object of the massage, and is an indication that it is improperly used.

The patient must be so placed that he is perfectly comfortable, with the limb in the position of greatest ease. As a lubricant, I prefer talcum powder, but oils and ointments may be used, if preferred.

The movements must be slow and methodical, about 15 or 20 to the minute, and each stroke must follow the path of its predecessor, beginning at the distal end and stroking the length of the limb in the direction of the venous current or of the underlying muscles.

At first, the location of the fracture is to be avoided, but as anesthesia deepens, this region is to be included. Gradually and imperceptibly the pressure is increased until the weight of the hand is borne, but never is any deep pressure made in this phase of the treatment. Later, local deep massage may be necessary to hasten the absorption of edema or exudate, but that is of a different nature and for a different indication than the process we are now considering.

Monotonously the strokes are repeated, traversing an unvarying course for a period of 10 to 15 minutes, when a change is made to another surface of the limb for a like length of time. Usually only two surfaces are treated at a séance.

At the first treatment following the injury, at least 20 to 30 minutes should be employed for the massage. During this time note is taken of irregularities in the position of the fragments and points of greatest tenderness, and, usually, a fair diagnosis of the nature of the fracture may be made. As the limb becomes anesthetized and the muscles relaxed, crepitus may be noted, which is usually painless, and correction of position may be made without pain.

The next step in the treatment is passive movement, which must likewise be slow, gentle and methodical, but must include every joint in the extremity. It is of the greatest importance to secure relaxation and absence of resistance during these movements, and this is often the greatest difficulty we have to contend with.

There must be no force whatever used, and no pain produced. The movements must not exceed the rate of 10 to the minute, and must cease whenever resistance is felt. The amplitude of the movements must be very slight at first, increasing as resistance diminishes, but it is not necessary to move the joint through its complete range to avoid adhesion. Every variety of movement of which the joint is capable must be practiced. During these gentle movements reduction frequently takes place, the fragments falling into position as the muscles relax. During the later séances amplitude and direction of the movements must never be such as to cause gross displacement; but slight movement between the fragments is in no wise injurious, indeed, it rather favors union through the stimulus of callus formation.

Active movements now follow the passive, but again only of such extent as can be painlessly produced, and, later, such as will not cause displacement of the fragments.

It is surprising how freely the patient can make active movements after an efficient séance of massage and passive movement. He often must be restrained or cautioned against excess.

If reduction has not been sufficiently accomplished during the séance, it must now be obtained as far as possible, and it is frequently surprising how easily it may be accomplished by manipulations previously unavailing from muscular rigidity. If reduction cannot be obtained without pain, an anesthetic must be administered and the usual manipulations employed. Following reduction, the limb is again massaged and the necessary splints applied, but always in such manner that they may be readily moved for treatments.

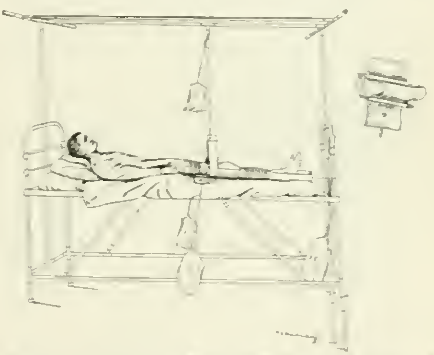
Fig. II.—Longitudinal, anterior and posterior pulls in fracture of the femur with posterior displacement of the lower fragment.

Championnière has been accused of having adopted the "do nothing" treatment of fractures, and it is thought by many that he dispenses with all splints. Nothing could be farther from the truth. He uses, but does not abuse, splints.

If the fracture is of such nature that little tendency to reproduction of deformity exists, the splints are removed daily for mobilization, and the above sequence of treatment is maintained; massage followed by passive and then active movements, increasing daily in amplitude as union becomes more firm.

If splints serve no useful purpose of preventing displacement, they are dispensed with from the beginning, and they are never worn longer than is necessary to guard against displacement.

If the fracture is of such nature that removal of the splints will allow displacement to occur, they are allowed to remain until such tendency has disappeared, or are removed in part sufficient for some massage and movement. A little is better than none, and gradually this may be increased as union progresses, but better is it that some displacement should occur than that the usefulness of the limb be endangered by prolonged immobilization.

As is readily appreciated, this method is particularly adapted to the treatment of such fractures as show little tendency to displacement after reduction, and fractures in which prolonged immobilization is productive of the most disastrous results. It is with such fractures that I would advise one to begin, but I feel assured that one will gradually increase the number of cases in which he finds it applicable as his confidence increases, and as its great advantages are impressed upon him.

We have found it of such advantage that it has taken precedence of all other methods in fractures of the forearm, especially of the Colles' variety, of the hand, wrist and elbow, of the clavicle, of the neck of the humerus, especially when impacted or without displacement, of the foot and ankle, especially Pott's fractures, and fractures of the malleoli.

In a few fractures of the neck of the femur, in which a prolonged stay in bed has seemed inadvisable, I have had the best of results, and in some tibia fractures it has been of advantage.

Always, it should play a part in every fracture at some stage of its treatment, even if of such a nature that its immediate and daily application seems inadvisable.

I cannot better emphasize the advantages of this method of treatment than by the report of a few illustrative cases taken from my private records.

Mrs. E., age 54. Fracture of Olecranon.

On January 9, 1912, she fell from a street car, striking upon the point of the left elbow. Referred by Dr. Evans on the following day, with a radiograph taken at a right angle, showing a fracture of the olecranon at its narrowest point, and a separation of the fragment of one inch at the posterior border of the ulna. The arm had been for 24 hours in a long posterior splint. The hand, forearm and elbow were considerably swollen, and the patient was in some pain. There was ecchymosis upon the inner side of the arm from the wrist to above the elbow. The elbow was distended, especially posteriorly. The fragment was evident, as a prominence above the normal point of the elbow, and the depression between the fragments could be easily felt.

The splint was removed and the extremity massaged for 20 minutes. Passive movements were given to the fingers, wrist and shoulder. The elbow was then slowly flexed and extended a few times, and gently brought to a right angle. An ordinary sling was applied, and the patient directed to use the hand as much as she could in the sling.

She returned every day to the office, and expressed great relief from the treatments.

At the expiration of a week, the swelling had disappeared. The fragment had descended until but a very slight groove could be felt at a right angle. The forearm could be passively extended almost completely, and flexed slightly beyond a right angle without the slightest pain. Active flexion was free to a right angle, but active extension was not permitted.

At the expiration of the second week, the sling was removed when at home, and she was permitted to use the arm for light work requiring no overhand movements.

At the end of the fifth week the elbow appeared normal. There seemed to be firm fibrous union of the fragment, with a separation which could be felt as a slight groove, but was not visible. There was free active movement at the elbow through about 120°. She could touch either ear, and get the hand easily to the mouth, back of the head and root of the neck on the opposite side.

At the end of the eighth week she was discharged. The elbow appeared normal in any position. At acute flexion a slight groove could be felt between the fragments, but no movement was appreciable. She could use the hand to button her collar in front and behind, and the finger tips could approach within two inches of the shoulder. The last 10° of extension was still lacking. She had no pain during movement, and used the arm freely.

I saw her again six months after the injury. She stated that the arm was as good as the uninjured one, and she could do with it any work she could before the injury. The finger tips came within one inch of the shoulder, and extension was almost, but not quite, complete. The olecranon felt slightly enlarged, and a very slight groove could be felt.

Mr. F., age 56. Colles' Fracture.

He was injured on December 5, 1912, by the kick back of his automobile crank handle. He was referred by Dr. Brainerd, under whose care he had been for neurasthenia.

I saw him within two hours of the injury. He was in great pain and would not allow the arm to be touched. There was moderate swelling, and slight, but typical, silver-fork deformity. Under ether, reduction was easily accomplished, with the disappearance of the deformity. A short anterior, and a long posterior straight board splint were applied.

The radiograph showed a transverse fracture across the lower end of the radius, about three-quarters of an inch above the lower end, with a vertical fissure extending into the joint. There was no deformity.

On the following day the splints were removed and massage and mobilization begun. The séances were continued daily for 17 days, then every second day for two weeks longer. At the expiration of one week the swelling had disappeared, but there was still ecchymosis almost to the elbow, along the radial side of the forearm. He still had pain at night, but said if the seance was given at 5 P. M. the relief lasted until almost morning. Movement of the wrist and fingers was free in all directions. Supination was still somewhat restricted. He signed his name legibly, and did his five-finger-exercises freely. On the ninth day, the splints were left off and the arm carried in a sling. The posterior splint he applied at night for four or five days longer, through fear of injury. At the end of the fourth week the arm was practically well, with motion perfectly free in every respect.

This was a Colles' fracture of moderate severity, but, considering the man's age, 56, and the fact that he was a nervous, sensitive individual, the result was gratifying. In younger patients the relief is so early, and the arm returns so quickly to the normal, that care must be taken that they do not overdo when the splints are removed.

In Colles' fractures showing little tendency to return of the deformity, it is seldom necessary to wear the splints over a week or ten days, but in the cases in which there has been marked deformity, with a tendency to its reproduction upon early removal of the splints, they should be worn for two or three weeks, by the end of which time the union should be firm and motion perfectly free in every respect, including supination, which is the last to recover.

One of my internes, a young man, with a Colles' fracture of moderate severity of the right wrist, continued his duties in the hospital, writing histories, examining chests and the like. His splints were discarded after a week, and he used the hand freely. He played tennis at the end of the third week.

Mennell, of London, who has had much experience with this method, says: "It may be anticipated that full functional utility will be restored for domestic, clerical and other non-laborious purposes, such as the playing of musical instruments and typewriting, in four weeks, and occasionally in three; in six weeks for ordinary labor; in eight weeks for work of any kind." My limited experience bears out his statements.

Mr. L., age 18. Comminuted Fracture of the Left Clavicle.

Injured July 21, 1913, by a collision of his automobile and a street car. Referred by Dr. Blass on the fourth day, with a radiograph showing a comminuted fracture of the clavicle in its middle third, a fragment about one inch long lying obliquely between the main fragments. The arm had been bandaged to the side by adhesive plaster, and an attempt made to hold the shoulder elevated. The weather being warm the skin of the hand was macerated; there was eczema of the chest and axilla with a disagreeable odor.

The deformity was marked, with the usual elevation of the outer end of the inner fragment. Crepitus was free, but the deformity was not appreciably reduced by elevating and drawing backward the shoulder.

I advised bed treatment, with Bardenheuer extension, or open operation. He would not consent to either, but readily agreed to be satisfied with the deformity, which I explained would follow the massage treatment.

All restraint was removed, and, after a séance of massage and mobilization, the arm was hung in an ordinary sling, attempting some upward pressure on the elbow.

He returned daily for treatment. The deformity diminished considerably, as each day the fragments were pressed into position with free crepitus. After the second séance there was no pain and he used the forearm freely in the sling. At the end of a week the sling was removed and he was permitted to put on his shirt and coat, and use the arm, warning against overhand movements.

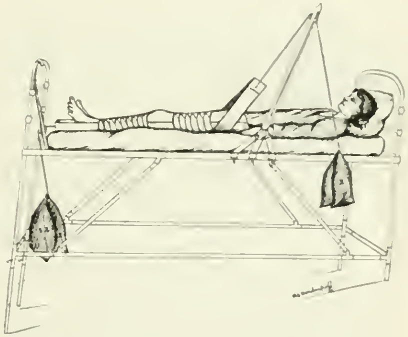

Fig. 111. Longitudinal and lateral pulls in fracture of the neck of the femur.

The crepitus persisted for three weeks, but he used the arm freely notwithstanding, as it caused him no pain. On the 28th day after his injury he went into the plunge and surf, and swam a few yards. On the 34th day he swam 150 yards, with the overhand or crawl stroke, and I discharged him. Deformity was present, but of distinctly less degree than when I first saw him, and no greater than I have had following treatment in the Sayre's dressing, even in fractures of less severity.

In clavicle fractures with little or no deformity this treatment has been ideal, and, after the first week, function has been practically restored with so little inconvenience that the patient scarcely realizes he has had a fracture. Where even slight deformity is to be avoided, it may be advisable to keep the patient on her back in bed for the first week or ten days, carrying out the treatment in that position, but in men, to whom some deformity is not objectionable, the sling answers every purpose. When marked elevation of the inner fragment is present, adhesive plaster, applied after the method of Hood, may be advisable, and in no way interferes with the massage or movements.

Mr. P., age 56. Fracture of Both Bones of the Right Forearm.

Injured February 17, 1914, by having his arm caught in a machine belt. Referred by Dr. Martin, on the same day, as a case requiring operation, since he was unable to maintain reduction.

I saw him a few hours after the injury. It was impossible to accurately palpate the fracture because of the swelling and heavy musculature but there was evident a fracture of both bones about in the middle third, with overlapping and lateral displacement.

The limb was massaged for half an hour, and placed in anterior short, and posterior long splints. There was complete relief from pain from the massage.

Each day following he came to the office for massage. The splints were removed and during the séance attempts were made to further reduce the displacement but without much success. He marveled at the lack of pain, in spite of the crepitus and free movement of the fragments.

On the sixth day a radiograph was taken, showing a transverse fracture of the radius at the middle and lower third, and of the ulna about one inch higher. The fragments overlapped about one-half inch, and there was medial displacement of both lower fragments but perfect parallelism of the bones. I showed him the picture and discussed with him the necessity of operation if we wished to secure perfect apposition of the fragments but advised him that under the massage treatment he would in all probabilities secure a perfectly strong and functionating arm. He left the decision to me, and I continued the daily séances.

At the end of the fourth week, there was firm bony union, and the splints were left off. There was no apparent deformity, save a small lump over the radial fracture. Motion of the wrist and elbow was perfectly free, but a tight fist could not be made, and supination was slightly limited. He carried the arm in a sling, except when exercising, for five days longer, when he put on his coat and used the hand in eating.

By the expiration of the eighth week, the arm was well, with all movements practically perfect. The grip was still weak, but he made a tight fist, and used the hand in kneading his clay.

This is an example of atrocious *x*-ray appearance, and of perfect cosmetic and functional restoration.

Mrs. B., age 75. Intertrochanteric Fracture of the Neck of the Femur, with separation of the trochanter minor. Probable impaction.

She fell from her couch, November 25, 1913, striking upon the trochanter. I saw her shortly after the accident.

A frail, small woman. The right lower extremity lay helpless in outward rotation, with shortening of about one inch. The slightest movement caused intense pain and muscular contractions.

I discussed with her daughter, who is a physician, the inadvisability of any treatment which would confine her mother long in bed, and advised the massage treatment. An intelligent nurse was secured and instructed in the technic. Sand bags were placed along the limb for a few days, and then discarded. By the third day all painful contractures had ceased, and she had no further pain.

After the fifteenth day she was placed daily in a chair. About the eighth week she could raise the heel from the bed, and all movements of the knee and hip were quite free and painless. In the fifth week she essayed crutches, but without much success, although it caused no pain.

I did not see her again until about four months after the injury, when she was walking about with the aid of one crutch; she walked a few steps without any support, bearing full weight upon the injured limb without pain. All movements were free and painless, but the limb was still weak and she was afraid. Union seemed firm, and there was no deformity, save about one inch of shortening.

Considering the age, 75, and that the treatment was accompanied with so little inconvenience, the result seems very gratifying.

In a number of fractures of the elbow in children, the results have been very pleasing. The children enjoy the treatments, and union with restoration of function is so rapid that these injuries are robbed of their terrors, for both the patient and surgeon.

The technic of this treatment is simple, but exact, and it is only fair that it should be followed accurately, as the master has outlined it, before judgment is rendered. Half-heartedness will yield results short of the best, and unskilful, rough massage and movements will defeat the object.

It should not be attempted without careful perusal of Championniére's little book, "Prècis du Traitement des Fractures par le Massage et la Mobilisation," or still better, of the work of his ardent disciple Mennell, "The Treatment of Fractures by Mobilisation and Massage," published by MacMillan & Co., 1911.

The second method of fracture treatment to which I would call attention is the one with which we have had the most experience in our hospital work, as it is adapted chiefly to those forms of fracture necessitating bed treatment.

The method of Bardenheuer consists of the application of permanent extension, by the use of adhesive plaster and weights, and is but an elaboration of the well-known Buck's extension, but so extended and improved in its details as to constitute a well defined system of treatment.

In Professor Bardenheuer's clinic in Cologne, the method is used exclusively for all fractures of the extremities, and its detail is the result of over 25 years of experience in many thousands of cases.

No splints whatever are used. The reduction of the fragments is maintained by the extension alone, for, in addition to the longitudinal pull, lateral, anterior and posterior pulls are applied as indicated by the nature of the displacement. As in most fractures of the extremities the persistent displacement is due, in great part, to the retraction of the muscles, the logical means of overcoming these forces is by forces likewise acting continuously but in the opposite direction. We have long recognized that the most rational method of overcoming longitudinal displacement, in the sense of shortening, is by longitudinal traction, but it remained for Bardenheuer to show us that lateral displacements could be overcome in like manner. The advantages of the method are not exhausted with the better reduction and retention of the fragments; the permanent extension also prevents retraction of all of the soft parts, preserving their elasticity and avoiding the troublesome stiffness of the muscles and the joint adhesions which so long delay convalescence after fractures.

The method permits early active movement, avoiding the muscular atrophy and circulatory disturbance which so frequently prevent use of the limb, long after the bone has become united. Absolute immobilization of the fracture is not obtained nor striven for, but accurate adjustment of the fragments is one of the main objects of the method.

The success of Bardenheuer's method is wholly dependent upon the detail of its application, and it is for this reason that its use has not been more rapidly adopted, for the technic seems, from description alone, very intricate and complicated. In practice, however, it is very simple, and it can be applied by anyone who has ordinary mechanical ability, after he has acquired a few of the essential details.

As it is impossible here to describe the application of the method to the various fractures, a description of some common forms will suffice to show the chief points of technic.

Let us illustrate with a typical fracture of the middle third of the femur.

A strong, firm bed must be selected, with an even, hard mattress, as the limb rests upon the bed without the intervention of splints of any kind. The longitudinal extension is first applied, as in the application of Buck's extension, but with a few important variations from the usual technic, which are essential because of the heavy weights used.

The plaster employed must be of strong material; we use the Z-O adhesive on moleskin. This comes in one- and five-yard rolls, 7 inches wide, which, torn lengthwise, makes the required width. The length must be sufficient to reach in every case, regardless of the location of the fracture, from the groin upon the inner side, around the sole of the foot to the trochanter major upon the outer side, and should preferably be of one piece. If, from reasons of economy, the yard length is used, the lower end must be securely tacked to the foot-board or spreader. The 3½-inch width being too wide for most ankles, the plaster should be tapered in its lower third to fit the leg. The foot-board or spreader should be but slightly wider than the ankle at the malleoli. If too wide, it spreads the plaster too much, drawing it away from the leg. If too narrow, the plaster presses upon the malleoli. It should be placed close to the sole of the foot. After properly shaping the plaster, the face-cloth which protects the adhesive surface should be removed, but not from its entire length, for it is desirable that it should not adhere at the knee, nor from just above the malleoli to the spreader.

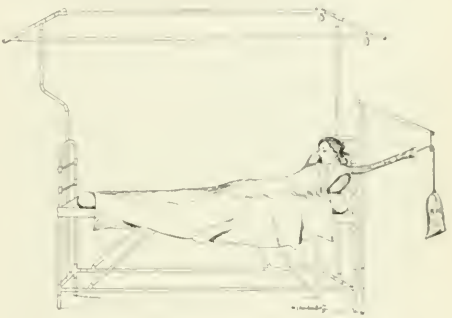

Fig. IV.—Extension in fracture in the neighborhood of the shoulder joint.

Under an anesthetic, if necessary, reduction is accomplished, and, while maintaining strong traction upon the foot, the plaster is applied smoothly to the unshaved limb. The longitudinal strips are now held securely in place by circular strips of ordinary Z-O adhesive, 2 inches wide, beginning a short distance above the malleoli, and reaching to just below the knee, each strip overlapping slightly the one below. The knee is left bare. Then, beginning a short distance above the knee, the circulars are applied in like manner up to the groin. This encases the entire limb, excepting the foot and knee, in a mantle of adhesive plaster. To the rope attached to the foot-board are hung weights, preferably sand bags, weighing 5 and 10 pounds each, sufficient to aggregate from 35 to 50 pounds in the adult, depending upon the size and muscular development, but always sufficient to overcome the shortening. With the adhesive applied as described, these weights are borne without great discomfort.

The bed, deprived of springs, should be elevated at its foot from one-and-a-half to two feet, or sufficient to balance the patient and his weights. Under the knee a folded sheet should be placed to prevent hyperextension, which causes severe pain.

No splints whatever are applied, and no sand bags nor other appliances. The limb is now straight to the eye, and, as a rule, has no tendency to eversion. It is our custom to wait for 24 hours before having a radiograph taken, in order that the extension may exert its full influence upon the contracted muscles. In many cases it will be found that sufficient reduction has been accomplished, and no other appliance is necessary.

Always, the dislocation ad longitudinam can be reduced with sufficient weight, and the displacement ad latum greatly improved.

If the picture shows lateral displacement still existent, then the lateral or anterior or posterior pulls are applied. These consist of strips of the moleskin adhesive 3½ inches wide, so applied as loops about the limb just above and below the fracture that traction upon them tends to overcome the displacement. For the lateral pulls the weights, consisting of sand bags of from 5 to 10 pounds, are hung upon cords which rest upon the mattress without the intervention of pulleys. The rope for the anterior pull passes through a pulley in the ceiling or upon a frame over the bed.

The posterior pull is applied by a device consisting of two parallel rollers connected by strap iron bands passing beneath the limb. The adhesive strip, with its cloth protection unremoved, passes under one roller, then over the limb and under the other roller. To each end a cord and weight are attached, hanging over the side of the bed. Thus backward traction is made upon the fragment.

Rotary pulls can be applied by proper application of the adhesive strips and suitable direction of the extending force. With a little ingenuity, the forces may be so applied that the tendency to displacement in any direction can be overcome. The force may be increased or diminished, or its direction changed, according to the indication as shown by the eye or touch, or by the radiograph, and always the limb is under direct inspection unobscured by splints or bandages.

The discomfort to the patient is slight after the first few days, if proper attention is paid to the points of possible pressure.

Properly applied, the first adhesive plaster will last throughout the 5 or 6 weeks of extension necessary for the union of the fracture, and when it is removed, the skin will be found with but few abrasions.

As soon as sufficient union has taken place, usually during the fourth week, movements of the hip and knee are begun, at first passive and then active. The side weights are removed and the longitudinal pull lightened during these exercises, which should be given twice daily. In the intervals the weights are reattached. Extension should be maintained from five to six weeks, or until firm union has taken place, when the adhesive plaster is removed.

For the following two weeks the patient remains in bed with massage and exercises twice daily, when he may be allowed up on crutches, but no weight should be borne upon the injured limb for two or three weeks longer, depending upon the nature of the union.

In femur shaft fractures, Bardenheuer's method has become our choice, and, save for the occasional use of the Hodgen's splint, no other method is used. Union has invariably been secured, and with a result, both cosmetic and functional, that is very gratifying.

Our femur neck fractures are treated by the same method of longitudinal extension, with the addition of a lateral pull at the upper third of the thigh which, by diminishing the inter-fragmentary pressure, prevents absorption of the neck. Contrary to the usual view, we have found these old patients to stand remarkably well the confinement to bed, and our mortality has been very low.

In fractures of the leg bones the adhesive straps are placed in exactly the same manner, but reaching only to the middle of the thigh, and in low fractures additional straps are placed about the ankle, exerting their force upon the foot.

In leg injuries we have found this method of great advantage, in comminuted fractures, and those difficult to retain in plaster of Paris, but especially in fractures involving the joints, as the freedom of movement prevents the annoying joint stiffness.

Fractures of the upper extremity which cannot be retained satisfactorily by the usual methods may require permanent extension, and the method is here quite as easy of application as in the lower extremity.

It is especially in fractures of the surgical neck of the humerus that we have learned to prize the method of Bardenheuer, as we have been able to secure results unequaled by any other method. In these fractures the typical displacement is an abduction of the short upper fragment by the muscles attached to the greater tuberosity with abduction of the lower fragment by the pectorals and latissimus. As it is quite impossible in these cases to control the short upper fragment by splints of any kind, it is rational to place the lower fragment in line with it. This is best accomplished by permanent extension with the arm abducted to the horizontal, or even to the perpendicular, in line with the long axis of the body, the patient lying upon a back rest. The adhesive strips are applied to the flexor and extensor surfaces of the forearm and arm, but do not adhere to the hand nor elbow. A longitudinal pull of about 12 pounds is applied with lateral pulls near the shoulder, if necessary. After about the eighth or tenth day, active movement is begun; the weights being lightened and the patient instructed to pull up the weights with gradually increasing excursions. After the third week the weights are removed by day and exercise with a staff is begun, the weights being reapplied at night for a week longer. In this manner atrophy and retraction of the muscles are prevented, complete elevation of the arm is assured, and the usual long period of disability is prevented.

We have secured in a number of patients beyond 60 years of age complete restoration of function in a remarkably short period of time. One woman in particular, past 60, with a loose fracture of the surgical neck of the humerus, and a fracture of the olecranon upon the same side, had complete restoration of movement and strength within three months of her injury, and, in the majority of our cases, active elevation of the arm to the perpendicular is possible within six weeks of the injury.

This same method is applicable to fractures of the clavicle, of the neck of the scapula, and for the after-treatment of shoulder luxations and resections of the head of the humerus. Elbow fractures, if not satisfactorily retained by splints or hyperflexion, may frequently be held by permanent extension, and the early movement which it allows assures early restoration of function.

As the method requires retention in bed, and close attention upon the part of the internes and nurses, we have limited its application to those cases in which simpler methods of treatment have not been satisfactory.

As our experience with Bardenheuer's method has increased, we have come to value it more and more in the treatment of those cases most difficult of retention. At the least, it is a most valuable adjunct to the mechanics of fracture treatment, and I am confident it will gain in favor in America, as it has in Germany, when its application becomes more familiar

A full description of the principles and detail of this method is contained in the little book by Bardenheuer and Graessner, entitled "Die Technik der Extensionsverbände," published by Ferdinand Enke of Stuttgart.

THE TREATMENT OF FRACTURES OF THE FEMUR WITH HODGEN'S SPLINT: INCLUDING A BIOGRAPHICAL NOTE ON ITS INVENTOR.

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I shall deal with the prognosis and results of fractures of the hip and of the shaft of the femur and their methods of treatment.

Scudder gives the following results in sixteen cases of fractures of the hip treated at the Massachusetts General Hospital, by traction and immobilization. Thirteen of the sixteen cases have impairment of the functional usefulness of the leg: all movement at the hip somewhat restricted: atrophy of the muscles of the thigh, buttock and calf of the leg and a decided limp. In only two cases out of sixteen could it be said that the leg was functionally useful.

Walker reports 112 cases of fractures of the hip: 18 died; 32 have not been found; 22 show improvement; 30 are unable to work because of persistent pain, and restriction of movement at the hip and on account of shortening and abduction.

Stimson and Hitzrot say: Prognosis even as regards life is far from cheering. The aged and feeble patient is liable to pass into a cachectic or demented state and thus to fade away.

Cotton gives a mortality of 25 per cent. for hip fractures.

We should think of the patient rather than the fracture. The majority are old people and they are apt to die from confinement to bed.

Scudder outlines the treatment of hip fracture under four heads: First, traction and countertraction. This is nothing more than the old-time Buck's extension, which is responsible for so many bad results.

Second, the Thomas hip splint. This requires a great deal of skill in its proper application.

Third, forcible abduction with immobilization by plaster of Paris (Whitman method). This is a very popular method, and while it is good in so far as union is covered, it is not without certain drawbacks or objections. In applying this method it is necessary to use an anesthetic, which we would all wish to avoid in the aged, among whom this accident is very common. Again, it is impossible to apply a plaster cast without having some degree of atrophy and wasting of the muscles and also stiffening of the knee-joint, which is a common complaint in cases treated by this method.

The fourth method is that of pegging. This is an ideal operative treatment, but it involves an operation and surgical risk.

In looking over the literature of fracture of the shaft, I see that the majority of men believe one inch shortening should be expected. In one of our large cities they were able to obtain the end-results in 242 patients, who had been treated in the different hospitals of that city for fracture of the shaft of the femur, and the results were as following: The average time in bed and with crutches, eight months; in adults at the time of discharge there was stiffness of the knee in 100 per cent. of cases; among adult laboring men 90 per cent. never become able to perform their regular occupations; and the shortening was from one to one and one-half inches in the majority of cases and in many of them there was over two inches.

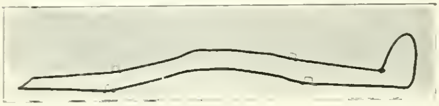

Fig. 1.

There are still a few surgeons who believe in the open method for all fractures of the shaft. I must say I cannot agree with them, for 85 to 90 per cent. of long bones fractures can be successfully treated by the closed method. With the open method, the slight improvement in position of the fragments that is obtained does not compensate for the additional injury to the soft parts by the operation.

The Hodgen's splint is applicable to any part of the femoral neck and to the shaft. We use it in all cases except the very young, also whenever we graft, plate or peg and in compound fractures of the femur. A piece can be cut out or unpinned opposite the wound and a dressing can be applied without disturbing the fracture.

It affords great comfort, requires little time to adjust, requires no elaborate apparatus, involves no danger of pressure injury, overcomes all displacing tendencies of muscular action, requires no anesthetic and from the beginning the patient may be allowed to sit up in bed with a back-rest to eat, read, write and use the bed pan. All this can be done without fear of displacing the fragments, for when the body is moved the limb in the splint moves as a whole from the hip-joint. Also one can thus treat the patient nearly as well in his residence as at the hospital and without a fracture bed.

It is the original Hodgen splint and not the Brown modification, which we see pictured in textbooks, to which I refer.

Any blacksmith can make the splint in a few minutes, if given the dimensions. The material is one piece of 3/16 inch brass or iron or #4 wire. The distal is six inches wide and the proximal eight inches, and this end is closed by an arch to pass over the thigh. The length of the splint is 36 inches. On the top of the frame four small loops are placed, two on each side, one pair nine inches from the proximal end, and one pair ten inches from the distal end (figure 1). These loops are for the supporting cords or straps. Twelve inches from the proximal end the splint is bent to an angle of about 170 degrees. This will allow the limb to become partially flexed. Four school straps or cords equipped with tent blocks are passed through the supporting loops on the splint and are passed through an iron ring about 12 to 14 inches above the frame. A sash cord is attached to the ring which is swung from the ceiling just below the end of the bed or some support not connected with the bed (figure 2).

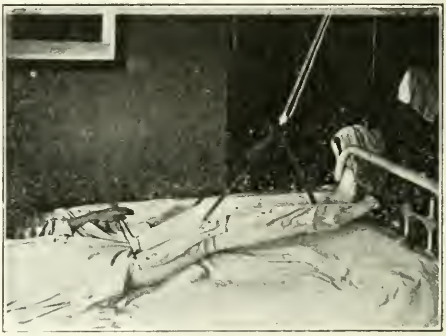

Fig. 2.

A piece of domestic or light canvas placed over the splint to form a hammock in which the limb may rest is pinned on either side with safety pins. The limb is prepared the same as for the application of a Buck's extension with the two or two and one-half inch adhesive plaster. The plaster extends about eight inches beyond the heel on each side and the ends of these are attached to the distal end of the splint or the adhesive. Short pieces of bandage can be attached to the free end. This will supply traction when the splint is in place. The splint is applied by making traction on the limb—it is slipped on the limb, the loop over the thigh, passing well up to the perineum. Then the adhesive plaster or bandage is tied to the cross piece at the end of the splint.

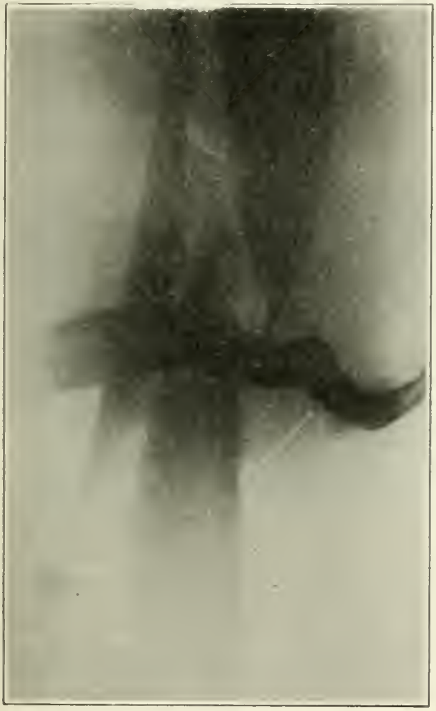

Fig. 3.

Elevation of the bed will afford counter-traction. The splint containing the limb is now suspended on the sash cord hanging from the ceiling. The leg (that is, from the knee) should be from four to six inches above the bed and parallel with the bed. A pair of scales should be placed between the rope and the ring for measuring the amount of traction, first weighing the limb and then moving the bed away from the point of suspension until an additional fifteen or twenty pounds register. The eversion is corrected by adjusting the straps or tent blocks. The bed is pushed to one side so as to abduct the limb, depending upon whether the fracture is high or low on the femur. The splint should always be suspended. Rest on a pillow will defeat every object.

We have treated thirty cases by this method. Twelve were fractures of the neck and eighteen fractures of the shaft. The ages ranged from eleven to seventy-four. There were three deaths: two fractures of the neck of the femur—one from pneumonia and the other from exhaustion; and the third, a shaft fracture, from infection (streptococcus). We do not believe these deaths can be attributed to the treatment used.

Four of the twelve cases of fracture of the femoral neck had no shortening and the remaining averaged half an inch; only one of the cases had more shortening, and this one had one inch.

Of the eighteen shaft fractures one had a bilateral fracture, and his left limb had a half-inch shortening. This patient was a lineman and reported to his same position in four months. In the majority of the shaft cases there was no shortening, but eight of these ranged from one-fourth to three-fourths of an inch (four one-fourth, two one-third, and two three-fourths). In all the above cases except one the functional results were good.

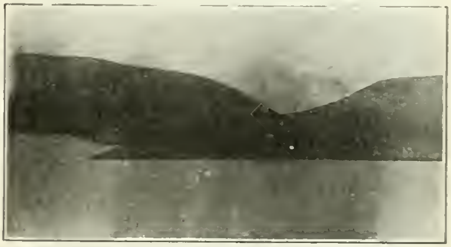

Fig. 4.

Figure 3 shows a compound comminuted fracture of the middle third of the femur which was caused by a pistol ball. I was called in several days after the accident and found the limb with two and one-half inches shortening and a drainage tube passing through the wound (anterior-posteriorly). There was temperature of 102° F. We removed the tube and iodined the wound well. The limb was put in a Hodgen splint and placed in abduction. After putting the limb up we had another picture taken (figure 4), which shows it was in good position. The wound drained about two weeks, an opening having been cut in the canvas for the purpose. Due to the complications (infected wound), we allowed the limb to remain up for nearly ten weeks. He has absolutely perfect function of the limb. He has only one-fourth of an inch shortening. In my opinion, this method is far superior to any other.

This splint was invented by John Thompson Hodgen, who was born in La Rue County, Kentucky, January 19, 1826. In his twentieth year he entered the Medical Department of the University of the State of Missouri, from which he was graduated in 1848, and later he filled both chairs of anatomy and physiology. When the Missouri College building was seized by the Government during the war, Hodgen transferred his allegiance to the St. Louis Medical College, where he filled the chairs of anatomy and physiology. In 1875 he assumed the chair of surgical anatomy of fractures and dislocations and was created dean of the faculty, which position he held at the time of his death. For eighteen years he taught clinical surgery at the City Hospital. During the Civil War he served as surgeon-general of the Western Sanitary Commission, 1861; surgeon, United States Volunteers, 1861 to 1864; and surgeon-general, State of Missouri, 1862 to 1864. He served as consulting surgeon to the City Hospital from 1862 to 1882, and was president of the St. Louis Board of Health from 1867 to 1868. He was president of the St. Louis Medical Society in 1872 and was chairman of the surgical section of the American Medical Association in 1876 and president of the American Medical Association in 1880. He was a powerful debater, and in the International Medical Congress in 1876 at Philadelphia, he won substantial honors that stamped him as a great man in the midst of the greatest the civilized world could produce.

He possessed decided mechanical genius, his inventions most worthy of note being a wire splint for fracture of the thigh; suspension cord and pulleys, permitting flexion, extension and rotation in fracture of the leg; a forceps dilator for removal of foreign bodies from air passages without tracheotomy; wire suspension splint for injury of the arm; double action syringe and stomach pump; and a hair-pin dilator for separating lips of the opening in the trachea, and as a guide to the tracheal tube.

He died in his fifty-seventh year of acute peritonitis, caused by ulceration of the gall-bladder, after a short and painful illness.

He loved his profession, was quick to cheer and help the meritorious and struggling young student and practitioner, and of a free and open nature. He was easy and familiar with younger colleagues, rejoiced in their emoluments, success, and honors, and gave them full meed of praise when merited, and never sought to monopolize the honors of his calling.

A man in the fullest and highest sense of the word, ever true to his convictions of right, loyal to his friends, tender in sickness and sorrow, wise and cultured from extensive and thoughtful reading, but much more so from direct and constant insight into the human frame in health and disease, the memory of John T. Hodgen will long be cherished as an enduring honor to St. Louis and to the profession which he ornamented.

COLLES' FRACTURE.

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Louisville, Ky.

In no other branch of surgery are mistakes in diagnosis and treatment more frequently made than in Colles' fracture; nowhere are results of inaccurate diagnosis and ill-advised treatment more deplorable. The truth of this has so frequently been impressed upon me during my nine years of practice that I have reason to feel the profession cannot be too often reminded of its duty.

Fractures of the radius take first place in frequency among all fractures, according to a number of eminent writers; and this I find in my own observation to be true. This is a long-studied and exceedingly frequent fracture, and presumably so well understood that it will be difficult to present anything particularly new, with the exception of two or three points in connection with the treatment. However, it does seem evident that an attempt at this subject is not amiss when we are forced to recall many cases in which there has been a failure to recognize or to properly treat.

A transverse fracture of the lower end of the radius ranging from ½ to ¾ of an inch above the lower end is the typical Colles' fracture, as described by him in 1814, but, clinically speaking, the term "Colles' fracture" is broadly used to mean any fracture or combination of fractures within an inch and a half of the lower end of the radius. These fractures may be comminuted, transverse, oblique, complicated, and sometimes compound, which present a very different picture from the initial simple Colles', and according to my observation will embrace from fifty to sixty per cent. of the fractures of the lower end of the radius.

The clinical symptoms may be more readily appreciated if the mechanism of the injury is considered. The forces concerned in fracture of the radius are as follows: Falling upon the palm of the extended hand, the force exerted by the counteraction of the ground against that part of the weight of the body thrown upon the wrist is transmitted to the carpus, which in turn as a solid unyielding mass, made so by its ligaments, transmits this force undiminished to the radius. Resistance of the ground, part of the body weight, velocity of the falling motion, are the components of this first force. Simultaneously the firm anterior ligament is put on the stretch, which, after exhaustion of its physiological elasticity, opposes the first force specified by pulling upon the radius. It is more resistant than the bone, thus the latter breaks more easily than the ligament tears. The lower end of the radius is therefore broken by pressure and by traction. The exclusive action of a blow or a tear is usually out of the question, considering mechanically that both forces must act to produce the fracture. The velocity of falling is accordingly of great importance in determining the site at which the force is transmitted. Therefore the point of fracture can be determined by the application of force. That the fracture can result at the distal end of the radius and not at its middle is explained purely by mechanical laws, the analysis of which is beyond the scope of this paper.

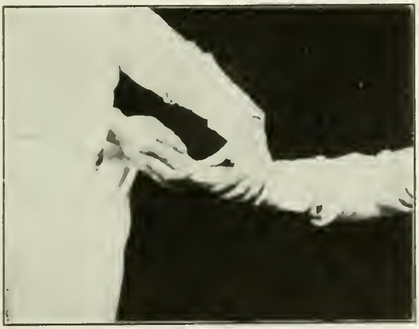
Fig. 1. Colles' fracture—first step in reduction.

The diagnosis of Colles' fracture in most cases is comparatively easy. However, in other or more atypical cases it would tax the ingenuity of an expert without the aid of the x-ray. The history of the force upon the surface of the palm of the outstretched hand; a backward and outward discoloration, or silver fork deformity; the styloid process of the ulna very pronounced and more anterior than that of the radius; the wrinkles in the skin of the palmar wrist surfaces more pronounced and deep; crepitation and abnormal mobility; the sudden offset and tense palmar ligaments; evidence of extreme pain on palpation over the head of the radius; discoloration or ecchymosis—these are the most important diagnostic points. In the picture just drawn, theer can be no excuse in not properly diagnosing Colles' fracture. On the other hand, in impacted or comminuted fracture,, where there is absence of intelligent history, of deformity, of abnormal mobility, and of the other prominent signs just mentioned, it may be very difficult to make the diagnosis. However, there are two leading symptoms, which I consider pathognomonic; one appears soon after the injury, the other may not appear until the third day. First, there is always extreme tenderness over the line of fracture; by grasping the forearm with your left hand, and the hand with your right, then making quick and firm pressure in line with the radius, if there is a fracture, excruciating pain will be elicited, otherwise, not. The second is the ecchymosis, which occurs in not only Colles' but in all fractures; the character of the ecchymosis is significant in this respect, that it rarely occurs for some hours after the injury, and as a rule at some distance from the site of the injury and is deep, not superficial like the ecchymosis from a contusion or bad sprain.

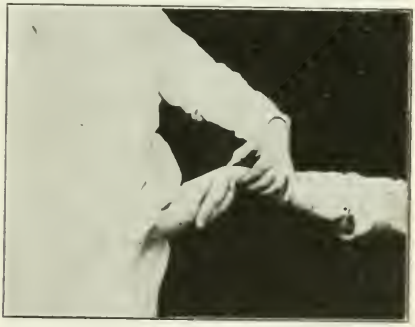
Fig. 2. Second step in reduction.

After the diagnosis comes the important question: What to do, how, and when? In no department of surgery is more all-around knowledge, good sense, and skill required than in the treatment of fractures. In my opinion it requires a more skilful surgeon to properly diagnose, reduce, and care for the average fracture than it does to perform the average abdominal operation. In no other phase of surgery are failures so frequent or so apparent to the layman. A badly reduced fracture is an opportunity for a malpractice suit, and most emphatically it is a living advertisement for the surgeon who fails to properly reduce it.

Some of the important causative factors contributing to imperfect function and deformity, not only in Colles' fracture, but all others exclusive of disease, are: First, failure to diagnose; second, the impossibility or failure to properly reduce the fracture; third, the improper appliances used; fourth, and one of the most important, the improper after-treatment; fifth, the unwillingness of the patient to conform to advice.

There is scarcely any excuse to offer in failure to properly diagnose a Colles' fracture at this day and age, with all the modern and scientific methods at hand. We may sometimes fail to diagnose a fracture by the clinical manifestations, but whenever there exists any doubt, we should use the *x*-ray or treat the condition as a fracture, although it may not be. I shall not discuss the clinical symptoms, the majority of these having been previously mentioned.

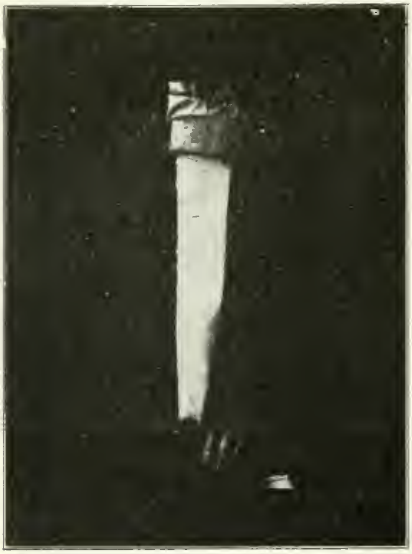

Fig. 3. Anterior and posterior splints applied—to be used for the first eight days of treatment.

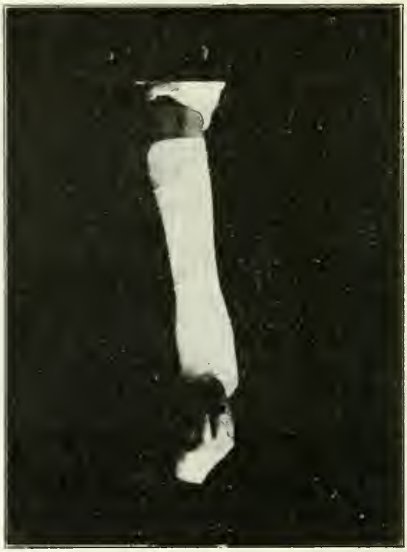

Fig. 4. Antero-posterior view of these splints applied.

To reduce a Colles' fracture there are almost as many methods as there are individual operators, and it seems to be merely a matter of individual choice as to the method to employ. It is erroneous, therefore, to say that you should grasp the hand in any specified manner; yet, there are some essential points that I believe should be borne in mind in order to obtain the best results with the least trauma. First, never manipulate the fractured member more than is absolutely necessary to make a diagnosis, until you are ready to reduce the fracture and to apply the splints; for the least amount of manipulation produces the least amount of exudation, and the least amount of exudate produces the least amount of callus. Second, in reducing a fracture, have your assistant hold the forearm steady, while you grasp the wrist with one hand, holding the thumb in the dorsal surface over the distal portion of the bone, and the middle finger on the palmar surface of the same bone; hold firm the wrist and the head of the radius, taking care not to make too much pressure; while with the right hand grasp the patient's hand so that the palmar surface of your hand and that of the patient's are in contact, with the thumb and index finger around the patient's thumb, and with the wrist between the index and midder finger. In this manner you are enabled to get a firm grasp. Holding the wrist firm with the left hand, make hyper-extension with traction until the fragments are unlocked, then with thumb of the left hand guide the head of the radius, and with traction and slight rotation flex the hand until the head of the radius slips into position.

If it is a typical transverse Colles' fracture, you will have very little if any trouble holding it in position; but if it is comminuted, you must manipulate to adjust the fragments while the hand is held in position, and this position must be maintained while applying the splints, otherwise it will not remain reduced.

The oblique Colles' fracture with a long fragment in the interosseous space is one of the most difficult to handle without marked deformity and without greatly interfering with pronation and supination. In this condition, make lateral pressure in conjunction with other methods, and this position must be maintained until the splints are applied.

I regard the kind of splints used as an important factor in the prevention of deformity and ankylosis. We know that by motion at the site of fracture, or by the movement of tendons gliding over the field of fracture, we produce an exudation of fluid and possibly blood under the periosteum; and if the periosteum is broken, as it usually is, then the exudate is not confined to the site of fracture, but involves the tendons and the surrounding structures of the joint. If the passive motion of the tendons is continued, extravasation of the fluid continues into these structures; and the greater the extravasation of fluid, the greater the callus formation; and the greater the callus formation, the greater the deformity; and the greater the deformity, the less function.

I consider that there is more stiffening of the fingers and wrist by the deposit of calcareous material in the tendons than by the deposit on the bone. To prevent this we must immobilize not only the wrist but the fingers for at least eight or ten days; by this time there is little danger of producing sanguineous exudation into the soft structures by movement of the tendons. As soon as this point in the treatment is passed, then passive motion is indicated. To prevent this extravasation of fluid and stiffening, use anterior and posterior splints from the elbow to the finger tips, cut to fit the arm, exercising care to have them wide enough to avoid lateral pressure with the bandage excepting where lateral pressure is indicated, as in oblique Colles' fracture; have the splints equally padded and apply them in the wedge shape, taking the precaution that the outer and inner edges are equi-distant, and that the splints fit snugly but not sufficiently tight to interfere with the circulation. Let the arm hang free, unless there is some special reason why this should not be done, for an arm carried in a sling invariably presents the bayonet deformity or an outward displacement of the lower fragment, due to the sagging of the arm in the sling—a condition I have been able to avoid by allowing the arm to hang free.

There are other methods in use by many operators, such as splints for flexion and extension, etc. It does seem to me that dressing the hand either in flexion or extension would produce either extension or relaxation of the flexor or extensor tendons, thereby causing the head of the radius to be tilted in whatever direction the hand is placed, and if retained in that position for a few days the deformity becomes permanent. Some use straight, short splints, permitting the fingers to be used, with special padding on the palmar surface of the forearm at the wrist, in order to make the arm conform to the splint, instead of making the splint conform to the natural contour of the hand and arm. This method often produces the silver fork deformity, instead of preventing it. All these methods I have used, and like all others who have had much to do with fractures, have been disappointed in a number of cases.

I have had a great many Colles' fractures come under my care, and for the last six years I have used the straight splints, allowing the arm to hang free (except in the case of an oblique fracture with the long fragment in the interosseous space), and with the exception of one of two cases have had perfect function and from outward appearances no deformity. This does not mean that the bone is always in perfect apposition when shown under the x-ray, neither does it mean that the arm is as good as it was before the fracture occurred, for that is impossible; but it does mean that the function and shape of the arm are as nearly normal as possible.

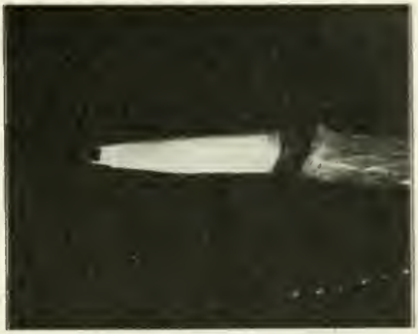
Fig. 5. Position of arm, without use of a sling. This prevents the occurrence of a bayonet-shaped deformity.

I like the straight splints with marked adduction in the oblique fracture, for the reason that the head of the radius is thus drawn toward the ulna and the long fragment is thus thrown backward into apposition, and is so held until union takes place.

The after-treatment, for at least eight or ten days, is the same as the first, except inspection and instruction to the patient to cut the bandage at any time it should become too tight, in the event he cannot reach his physician. It is preferable to take the risk of having to reset the arm than to have a myositis with its following contractions, and this condition will manifest itself within the first twenty-four to thirty-six hours. Otherwise, in the after-treatment, the splints should remain as applied without interference, unless swelling or other pressure symptoms arise to necessitate changing.

After the first ten days remove the splints, and make slight movement, which should be repeated at intervals of two or three days. Leave the anterior splint off, and use only the one dorsal splint. The anterior splint should never be used excepting in conjunction with the dorsal, as it will not only fail to correct a deformity, but will produce one in an otherwise perfectly reduced fracture. Keep the dorsal splints on, as an average, in the case of a young person, about three weeks; in the case of an old person, about four weeks; then remove all dressings excepting perhaps adhesive plaster, to support the wrist, and practice passive motion.

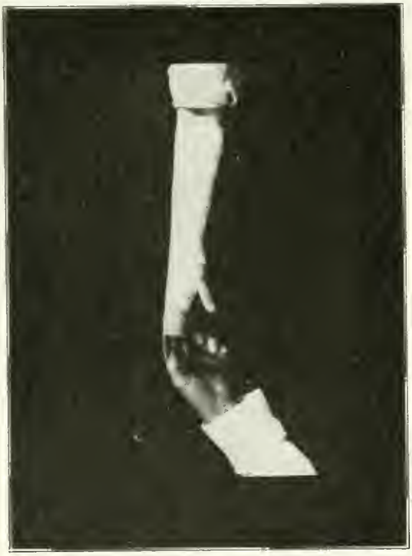

Fig. 6. Palmar splint removed and dorsal retained after first eight days.

In some cases where the fracture is high, complicated with a fracture of the ulna, it may be impossible to hold the fragments in place without resorting to the open operation; but in my opinion we should never make a compound out of a simple fracture if there is any way to avoid it.

In cases where there are fragments of bone so located as to interfere with motion, it is better to wait for some time after the injury to expose the site of the fracture, not with the idea of replacing the bone, but to remove such pieces of bone in comminuted fractures as interfere with motion.

In impacted fracture, where the position is not good, give a general anesthetic, liberate the fragments, and reset the bone; if you do not, it will always give trouble.

Other methods of reducing and treating fractures, such as are given in books, I have purposely refrained from discussing. The facts as set forth in this paper are based entirely upon personal observation in my private practice and in clinic cases with Doctors Aud and Woodard. In am also indebted to Dr. Bayless for the excellent *x*-ray work he has done with the clinic cases.

After the study and treatment of not only Colles' fracture, but all fractures, I would like to quote Dr. John B. Murphy: "Put nothing into a fracture but common sense," and permit me to say further, the doctor who treats fractures most successfully is the one who uses common sense mechanically inclined.

THE TRANSPLANTATION OF FAT AND FASCIA FLAPS IN SURGERY.

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At the outset let it be understood that I have done no original work in this field. The information and the facts here presented have been obtained only by a perusal of the literature and a very small number of cases operated upon by me. It is my desire to give due credit to the classic articles by Kirschner[1] appearing in 1909 and Kleinschmidt[2] in 1914. The latter refers in his bibliography to 163 separate papers upon this subject. Since that time many new papers have appeared in various journals by other authors, so that the literature upon the subject is now voluminous indeed.

The credit for the establishment of free transplantation of fascia as a method in plastic surgery belongs to Kirschner, who published his experimental work in 1909 and a year later published a series of clinical cases.

The first work Kirschner did was to repair tendon injuries with tendons, but he encountered the difficulty of finding little autoplastic material available, so he began to use fascia for the purpose.

An earlier reference to fascial transplantation is the article of Bayard Holmes[3]. To correct an ankyloses of the jaw he interposed a pedicled flap of fascia belonging to the temporal muscle. The functional results were good after the operation. This and, no doubt, other isolated cases, show that fascia transplantation was occasionally used before Kirschner's article. Credit is generally given him for originating the method because he was the first to write an extensive paper on it and to show by experimental work its various possibilities.

Kirschner states: "One of the chief reasons why fascia is such an excellent material for transplantation is that it heals without any reaction; both in cases where it is at rest and where rather severe functional demands are made upon it, autoplastic fascia shows a marked tendency to become incorporated with the neighboring connective tissue. This often occurs even when asepsis has not been perfect. Some surprising results have been obtained in covering over infected hollow organs. The transplanted fascia may undergo changes, such as swelling and vascularization and may be transformed into connective tissue and fat; but in many cases it remains intact in its original form. Fascia has the advantage over other tissues in that it is easier to obtain and in large amounts. There are no serious results which have followed even the removal of large areas of fascia lata."

Kornew[5] has made a careful histological study of the transplants in several series of experimental cases. He transplanted fascia to fill in gaps in the tendo Achillis in 30 rabbits and 3 dogs, repaired defects in the thoracic wall in 12 dogs and defects in the abdominal wall in five dogs. He found that the transplanted fascia took perfectly in its new location, no matter what size it was. When it is transplanted it is removed from its nutrient vessels, so that at first there are signs of beginning degeneration, shown by poor staining, swelling and even disappearance of the nuclei of the fascia bundles; but the fibers of the bundles scarcely change at all. The nutrition of the fascia is restored to normal after two or three weeks, when new vessels from the surrounding tissue penetrate the perifascial and endofascial layers of the transplant. The change is manifested by a more intense color and an increase in the size and number of the nuclei, but later the *size and number* decrease again to the normal. The transplanted fascia is enclosed on all sides by a mantle of new-formed connective tissue, which as time passes on takes on an almost fibrous character. This tissue penetrates the perifascial and endofascial layers but does not enter the fascial bundles.

Where great functional demands are made on the fascia, as when it is used to repair tendons, it gradually takes on the structure of the tendon, so that after three months it cannot be distinguished from it. When it is used to repair defects in the abdominal wall the same process takes place, but more slowly, the transplanted fascia finally assuming the structure of the surrounding tissue. In the thoracic wall, where there is less tension and where tension is more uniform, the fascia retains its original structure, even after a year, when all progressive processes have stopped. The elastic fibers of the fascia are not only preserved, but they increase and penetrate the surrounding cicatricial tissue, changing the character of the scar so that it becomes more elastic.

Hirano[6] used fascia experimentally upon 15 animals, dogs and rabbits, and reports his results as follows: Of the 15 cases, there was suppuration in 8, but in spite of the suppuration, the transplanted fascia remained in tolerably good condition. It remained wholly or partially in connection with the chest wall. In the seven cases that did not suppurate, the fascia lived and did not change its structure materially, though as time passed, more and more intimate connection was established with the surrounding tissues. Hirano states it did not change into fat tissue as reported by Von Saar, nor into connective tissue as reported by Denk. He also stated there was no adhesion of the lung to the fascia in three of the non-suppurating cases in rabbits and in two other cases only very loose adhesions by means of fine fibrous bands. In two cases where there were subcutaneous abscesses there were adhesions over only a small area at the site of the suture. When there were no adhesions the fascia was covered over with endothelium in a short time. Dogs are much more sensitive to intrathoracic operations than rabbits and also than man.

Fascia has been used practically in a great variety of situations: those in which traction is made on the transplanted fascia, as in bridging defects in muscles, tendons or ligaments, bridging defects in the walls of body cavities, fastening parenchymatous organs in place, in correcting prolapse, filling defects in bony cavities, in occluding the stomach or intestines, those in which pressure is exerted on the fascia, as in covering amputation stumps and when it is used to mobilize the resected ends of joints; those where no functional demand is made on the fascia, as in making sheaths for nerves, covering wounds in parenchymatous organs and in strengthening the lines of suture.

One of the chief uses of fascia is its substitution for joint ligaments, as in habitual luxation of the shoulder or knee joints. In the former joint Kirschner passes a band of fascia under the deltoid and over the joint capsule of the head of the humerus. Payr's[7] method, which has given excellent results, consists in fastening a triangular flap of fascia lata on the anterior side of the joint, its apex being fastened to the coracoid process and the flap sutured with three rows of sutures to the pectoralis major muscle. A similar flap is then applied posteriorly, its apex being fastened to the head of the joint and the flap sutured in the same way as the anterior one to the infraspinatus and teres major muscles.

Fascial flaps are also used to replace the internal ligaments of the knee joint. Giertz,[8] in his method, uses two flaps of fascia, fastening them to the two epicondyles of the femur at one end and to the tibia and fibula at the other.

Fascia has also been used for the correction of flat foot, but the method is applicable only when supination can still be attained.

Fascia has also been used experimentally and clinically to replace paralyzed muscles. Payr had good results in a case of deltoid paralysis and Cramer in congenital bilateral paralysis of the trapezius.

Payr[16] has also reported the successful transplantation of fascia in a case of rupture of the biceps muscle. In his case the long head of the biceps was torn, the tendon was stretched and the muscle contracted into a round ball with inability of the patient to use it. A loop was made in the tendon, it was sutured into the muscle and a sheet of fascia sutured around it with good immediate results.

Fascia has also been used in the case of paralysis of the serratus magnus by passing a loop of fascia from the angle of the scapula around a rib lying in the course of the muscle fibers. Fascia transplantation has also been used successfully several times in ptosis of the eyelid, the strip of fascia being passed from the frontalis muscle to the tarsus. In facial paralysis a strip of fascia is passed from the angle of the mouth up and over the zygomatic arch.

Fascia is now being used extensively to replace tendons, as it is excellently adapted for this purpose. McArthur[9] advocates the envelopment of the transplant in a sheath of fat to prevent adhesions.

Fascia is an ideal material for covering defects in the thoracic or abdominal walls. In cases where it has been necessary to remove pleura or peritoneum and the defect is replaced with fascia, the transplant soon become covered with endothelium (Kornew, Hirano[10]). The flap must be made large enough to lap over the edges of the defect a little. Hernia has never followed the use of fascia in covering the defects in the abdominal wall. The fascia often takes even in an infected field of operation (Schmid[11]).

Kleinschmidt states that fascial transplantation should be done in practically all hernia cases, to prevent a recurrence. The fascia should be applied under tension and a large sheet should be used extending far beyond the lines of suture. The application of the fascia in femoral hernia is not as easy as in inguinal form. Wilms fastens a double piece of fascia to the posterior edge of Poupart's ligament, so that it hangs down like an apron in front of the internal femoral ring. He makes the piece large enough so that it covers the posterior side of the femoral vessels. It is not necessary to fasten the lower edge, for the intra-abdominal pressure presses it against the vessels and the inner side of the horizontal ramus of the pubic bone so that it quickly becomes adherent. Fascia may also be used in umbilical hernias and hernias of the linea alba if there is any danger of the closure not being firm enough.

Henchen[12] has successfully used fascia in experimental work to cover gaps in the diaphragm. His method of approach was from the thoracic side.

Korte in 1910 was the first to use fascia for the repair of dura, and since then he has been followed by many surgeons who have performed many such operations. The permanent as well as the immediate results were good where fascia had been used after recent injuries, after the removal of brain tumors and in plastic operations for cortical epilepsy. The fat of the fascial transplant should be turned toward the brain. Fascia has also been used to cover defects in the spinal dura as in spina bifida. The flaps must, of course, be longer than the defects and should be pushed under the edges of the bone.

Fascia is used to cover defects and to strengthen sutures in hollow organs, including the stomach, intestines, bladder, urethra, ureter, esophagus, trachea and bronchus. All these organs are either movable or change their form as they fill up so that the chances for healing by primary union are remote.

Fascia has also been used for suspension of the kidney. The method as used by Kirschner has been to pass a broad band of fascia through two small openings in the capsule at the upper pole of the kidney, then to be brought over the twelfth rib and sutured into a closed ring, which holds up the kidney. Kocher and Henchen take a broad strip of fascia and place it under the lower pole of the kidney, so that the kidney hangs in it as in a sling, which is fastened to the fibrous capsule. The kidney is then placed in its proper position and the fascia sling fastened to the lumbocostal and lumbodorsal fascia.

Fascia is also recommended to be used to strengthen sutures in blood-vessel work—especially where the suture is difficult or where the vessel wall is diseased.

It is also used in orchidopexy. Kirschner's method is to throw a flap of fascia over the testicle like a net over an air-balloon, using the free ends for fixation to the perineal fascia.

Fascia has also been used to correct rectal and vaginal prolapse and for ligating the pylorus. Wilms[13] in 1911 was one of the first to use it for pyloric exclusion, although Bogoljuborr[14] as early as 1908 had experimentally demonstrated its value. Wilms' method consists in putting the strip of fascia rather loosely around the pylorus, so that the opposite mucous surfaces of the pylorus touch each other, and suture the ends of the strip together. The fascia contracts later so that the closure is firmer.

Fascia seems to be especially well suited for mobilization of the knee joint and may be used either free or pedicled. Delital and Serza, pupils of Putti,[8] have shown not only that the functional results are good, but also that the fascia preserves its histological character. Fascial flaps, either free or pedicled, may be used in mobilization of the elbow joint, hip joint, wrist joint, jaw, etc. Pedicled flaps have been most used and have given brilliant results.

Fascia may be used for making sheaths for nerves after nerve suture and following traumatic injuries to nerves where the integrity of the nerve is in danger from compression or by adhesions to neighboring structures.

Fascia has been used to cover wounds and control hemorrhages in various parenchymatous organs, such as the liver, kidney, spleen, etc. Waljaschko[15] and Lebederr had shown experimentally that free transplantation of fascia does not call forth any proliferation of connective tissue inside the parenchymatous organ. To enclose a wounded or ruptured organ in a flap of fascia is the best substitute for suture; even if it is closely enveloped in fascia no atrophy of the gland tissue is produced. It is an important factor in prompt healing to remove the blood from the wound by suction before the fascia is applied.

In the following cases operated upon by me autogenous transplantation of fascia was used:

Case I. Mr. J., janitor, age 42, November 23, 1913. Referred by Dr. Hunt. Admitted to St. Elizabeth Hospital at 9 P. M. on account of gunshot injury to the left hand. In the afternoon, while out hunting and in crossing over a log, the gun was accidentally discharged. The entire posterior *surface* of the hand with the second row of carpal and first metacarpal bones was destroyed. The extensor tendons were destroyed. Hemorrhage had been quite profuse but had ceased. Under ether anesthesia the wound was cleansed, the remaining fragments of the metacarpals and carpals removed and the tissue fragments trimmed. The tendons were united. The hand was materially shortened, but this was deemed superior to an artificial hand. Suppuration occurred and the union of the tendons gave way. Upon cessation of suppuration and cicatrization of the wound, effort was again made to unite the severed tendons. Accordingly, on January 21, 1914, the second operation was carried out. Through a crucial incision, with reflection of skin flaps, and after some effort, the ends of the severed tendons were found and union again accomplished. To cover over this defect and to cover and protect the tendons and prevent adhesions, a fat and fascial graft from the right thigh was taken. The graft measured two by three inches and was sutured over the tendons and annular ligament. Uneventful convalescence and union followed with almost complete restoration of function.

Case II. Miss M. V., age 32, January 23, 1914, entered St. Elizabeth Hospital for the removal of a tumor involving the external suprapubic region, and also for a fibroid of the uterus. The tumor involved the ventral wall and was slightly to the left of the old scar of a laparotomy eight years before for a left ovarian cyst. Under ether anesthesia the tumor (fibroma) was removed from the abdominal wall. The muscles were not involved in the growth. An area two by three inches of fascial wall was removed. A supravaginal hysterectomy was done. To close up the large defect in the abdominal wall a fat and fascial graft three by four inches was taken from the left thigh and transplanted. Healing occurred by primary intention and convalescence was uneventful.

Case III. Mr. L., blacksmith, age 51, large and corpulent. Entered St. Elizabeth Hospital February 9, 1914, with a large left inguinal hernia. It proved to be a large sliding hernia of the sigmoid. The sigmoid was freed and a flap of peritoneum incised on either side and sutured posteriorly and the viscus returned to the abdominal cavity. It was impossible to close the external ring owing to sparsity of fascial tissue—the defect being an area of two and a half by two and a half inches. A fat and fascial graft was taken from the patient's right thigh and sutured over the defect. Healing occured by primary union and convalescence was uneventful.

Case IV. Mr. J. F., age 52, farmer, January 16, 1916. Referred by Dr. Laird. Was admitted to St. Elizabeth Hospital on account of urinary retention. Five weeks previously he had received an injury to the perineum from a fall from a haystack astride a fence. Following the fall the perineum and scrotum became markedly ecchymotic, but the patient was able to void his urine with some difficulty. This condition continued up to the day preceding his entrance in the hospital, when further voluntary urination became impossible. All efforts at catheterization were unsuccessful. Immediately upon his entrance in the hospital a suprapubic cystostomy was done under local anesthesia and 48 ounces of urine removed. Five days later a perineal urethrotomy was performed with the view of finding both ends of the urethra and bringing them together. The perineal urethra was found completely destroyed and replaced by scar tissue. Attempts at dissection of the perineal and penile portions of the urethra were futile owing to the friability of the tissue and it became impossible to approximate the ends—the distance being a little more than an inch. A fat and fascial transplant from the thigh was rolled into a tube and sutured over both ends of the torn urethra, the fatty portion being toward the lumen.

Both suprapubic and penile bladder drainage were instituted and the wounds closed. All augured well for more than two weeks when the transplant extruded from the perineal wound and ten days later came away. Upon February 14th a third effort was made to bring both ends of the urethra together by a more radical dissection of the region which was then successful. Full recovery followed.

Case V. Mr. W. S., age 32, farmer. Referred by Dr. Towne to St. Elizabeth Hospital December 6, 1915, with a compound comminuted fracture of the left temporal and parietal region, the contents of the cranial cavity oozing out. Hair and dirt were intimately associated with the wound. Fragments were removed and the area cleansed. A larger fragment, 1½ by 2 inches, was reinserted to assist in closing the large skull defect. A stormy convalescence followed and after a period of four weeks he was able to return home—a discharging sinus still present. Later the amount of discharge became more pronounced and he was advised to reenter the hospital. On March 7, 1916, the bone fragment was removed and an autogenous transplant of fat and fascia measuring 2 by 3 inches was inserted under the skull. Uneventful recovery.

Case VI. Mr. A. M., aged 20, December 3, 1915, farmer. Referred by Dr. Johnston. Patient was injured about 10 o'clock in the morning while "flipping" a freight train. It was found upon his entrance into St. Elizabeth Hospital that he had a scalp wound over the vertex, the right arm was badly lacerated, all the tendons of the flexor and extensor surfaces were exposed, and there was a compound dislocation of the wrist joint. The ulnar and radial arteries were intact. The wound surfaces were filled with cinders and dirt and altogether the outlook for saving the arm was unpromising, but the attempt was made. The wound was sutured as best we could—the dislocation reduced and alcohol dressings applied. Some suppuration followed, but with no serious effects. Later, at various times, skin grafts were supplied to the uncovered areas, which in most part were successful. It was impossible to keep the dislocation of the wrist joint reduced. On March 31, 1916, after healing was complete in every way, the ends of both ulna and radius were resected and a fat and fascial transplant from the thigh inserted. Uneventful convalescence.

Case VII. Walter K., age 17. Referred by Dr. T. D. Smith. Parents in good health. One sister, age 21, was operated upon recently by me for a pyloric ulcer. The patient had the usual diseases of childhood. At the age of 10 years he fell from a swing to the ground, a distance of 12 to 15 feet, striking upon the left side of his head. Unconsciousness followed the fall, but he does not know how long it lasted. There were no other immediate effects, and the next day he was about as usual. Three years later epilepsy developed. The convulsions occurred both at night and in the day time. The number of attacks was variable—several occurring in succession with several days' intermission. He complained of a "heavy" feeling in the left temporal region. A skiagraph showed pronounced thickening of the skull at the superior portion of the left parietal and occipital portions of the skull. A slight depression of this region was also noted. An exploratory operation was suggested, to which the family readily consented. Accordingly, on April 3, 1916, at Theda Clark Hospital, a section of skull involving the left superior parietal and occipital regions was removed. The bone was abnormally thickened. Many organized dural adhesions were encountered and freed. A fat and fascial flap from the left thigh, measuring 2½ by 3 inches, was transplanted to cover and fill in the defect. The fatty portion was placed toward the brain. Healing occurred by primary union. One very light "spell" occurred about a week later. After a period of two weeks the patient left the hospital. The time which has now passed is too brief to know what effect the operation will have upon the epilepsy.

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HYDROCELE AND ORCHITIS: THEIR RELATION TO TRAUMA.*

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It is my purpose to present this subject chiefly from the standpoint of the medical advisor in questions of liability for compensation or damages.

These conditions, like hernia, are frequently met in the practice of the general practitioner as well as in that of the surgeon; they furnish the basis for many claims in the files of the insurance adjuster and claim agent, and not rarely find their way into the courts before they are finally disposed of. These lesions, like hernia, afford a fruitful and tempting field for misrepresentation and fraudulent claims; they are as a rule easily concealed, so that their possessor can continue at his occupation and await such time as may to him seem an opportune moment for carrying out his long contemplated plan of posing as the victim of an accidental injury.

As a basis for my remarks I shall briefly relate several recent cases, which illustrate in a very concrete manner the unreliability of the history furnished by the patient in this class of cases, and the consequent difficulty of determining and correctly estimating the factors which may have participated in their causation.

Case I. A middle aged laborer presented himself with a painful enlargement of the left testicle, claiming that he had been struck by the end of a board. He denied all knowledge of any enlargement prior to the injury, which he claimed to have sustained while at work, shortly before the examination. There was no evidence of trauma to skin or other structures. Venereal infection was denied, and there was no evidence of his having had gonorrhea, tuberculosis or syphilis. Chills, and fever, together with rapid increase of the size and painfulness of the swelling, clearly indicated a suppurative condition. Operation disclosed a suppurating dermoid cyst; he then admitted having had a marked enlargement of the affected gland since boyhood, said nothing more about the injury and made no claim for compensation or damages.

The tendency of dermoids to suppurative infection has long been recognized by the profession. That this tendency may be increased by trauma is possible, but the majority of suppurative cases give no history of injury.

Case II. A laborer, about 30 years old, was seen within an hour after an alleged injury to the right side of the scrotum, caused by falling against the upper end of a shovel, covered at the moment by one of his hands. He was apparently suffering agonizing pain, and on the gentlest attempts at local examination squirmed and complained so excessively as to at once arouse a suspicion that he was simulating. The right side of the scrotum presented a large swelling, approximately five inches in length and two to three inches in thickness, oval, only moderately tense, and clearly containing thin fluid. Tenderness appeared to be uniform throughout the mass. Hernia was easily excluded. There were no urethral discharge, scars, or enlarged glands. He persistently denied ever having had venereal disease or having had any swelling whatever prior to the accident. The urine was normal.

He was put to bed, the parts well supported and hot moist compresses applied, but no anodynes allowed. The complaint of pain and tenderness disappeared with surprising rapidity, but no appreciable change in the size of the swelling took place during the following week. Diagnostic puncture resulted in the withdrawal of perfectly clear serum. Diagnosis, chronic hydrocele. At operation, seven days after the alleged accident, the tunica vaginalis was found distended with perfectly clear hydrocele fluid, which formed almost the entire mass of the swelling; the membrane itself was greatly thickened throughout and showed numerous patches of almost papillomatous thickening, but not the slightest evidence of recent injury or acute inflammation. The entire epididymis was enlarged to more than twice its normal volume, and markedly indurated throughout. The testicle itself showed no abnormality except a slight uniform enlargement. The vas was somewhat thickened, but not nodular. Extraserous transposition of the testicle was done, the thickened tunica partly dissected out and partly stitched back around testicle and cord. The wound healed per prima, and after a month's time only a slight enlargement of the gland remained.

The local conditions found in this case on first examination, as well as the findings at the operation, only seven days later, totally discredited this man's version of his history. Were it possible to get so great a distention of the tunica vaginalis within an hour's time, which I doubt, the swelling would certainly be exceedingly tense. The pathologic conditions found at operation were of an unmistakably chronic nature. If trauma was a factor in the case at all, it had merely acted as the cause of an acute attack of pain in a previously diseased organ. The case was clearly one of hydrocele associated with an infectious epididymitis, both of long standing.

Case III. A track laborer, 18 years of age, claimed to have been injured while handling a heavy jack, the upper part of which struck him in the region of the left groin. On first examination, eight days after the alleged accident, the left testicle was found enlarged to three or four times its normal size, only slightly tender, decidedly harder than the average acutely inflamed organ, and of irregular consistence, the cord somewhat thickened, but containing no distinct nodules. There was no indication, in the form of ecchymosis or otherwise, of any injury to the skin or other tissues in the vicinity. He denied having had any form of venereal disease or any previous injury, and insisted that up to the time of the accident there had not been the slightest enlargement. He was put to bed, the parts well supported, and the enlarged organ treated for several weeks with applications of moist heat, repeated adhesive plaster strapping and other non-operative methods, without bringing about any change in the size of the swelling.

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Chemical and microscopic examinations of his urine, Gram stains for gonococci, von Pirquet test for tuberculosis, and a Wassermann test all gave sion to the hospital an abscess developed on the anterior aspect of the swelling; this was found to extend into the gland proper, it was opened and kept well drained, but refused to heal completely. Finally the diseased testicle was laid wide open by an anterior longitudinal incision along its entire length. But the gland proper and the epididymis were found involved, the cavity of the tunica vaginalis largely obliterated by adhesions, the greater part of the gland parenchyma destroyed by suppuration or replaced by connective tissue proliferation of low vitality. Microscopic examination of portions of this tissue showed no evidences of tuberculosis or syphilis. The diseased tissue was freely excised, the cavity kept packed and complete healing resulted in about three months. At the time of discharge, the gland was nearly twice the size of its fellow, but free from pain or tenderness; he was in excellent general health, had gained considerably in weight.

The early clinical findings in this case were so entirely out of accord with the alleged history, that the latter simply had to be disregarded. The matter was not cleared until after the young man had been discharged and his case disposed of, when I met the boss of the gang in which he had worked, who informed me that for several months while working with his gang, the man had frequently complained of pain in the region of the scrotum, had asked for light work, had been engaged as a water carrier, and had not been allowed to handle a jack for several weeks prior to the alleged accident. If trauma had anything to do with his disability, it was in all probability by way of stirring up an old infection or bringing on an attack of pain in a previously diseased and enlarged gland.

Case IV. A laborer, about 25 years of age, presented himself for examination about eight months after an alleged injury to the right side of the scrotum. His statement was that he received a blow with an implement, but was able to continue his work. There was no discoloration, or other mark of injury to scrotum or surrounding structures. The enlargement had increased slowly and in the course of a week reached a size about four or five times that of the other testicle. Since that time the enlargement has remained practically stationary. He has worked more or less throughout the eight months, and consulted a physician only two or three times. He denies all history of venereal disease, shows no scar, no enlarged lymphatics, no urethral discharge, no stricture, no indications of tuberculosis; the urine is normal, and his general health good. The swelling is oval in shape, the upper pole as broad as the lower, not translucent, not more sensitive to pressure than the normal gland; its lower portion feels uniformly firm, while the upper part gives decidedly the impression of containing fluid. Aspiration of the upper portion resulted in the withdrawal of clear serium, while lower down the result was negative. Operation disclosed a hydrocele of the upper portion of the tunica vaginalis, while its lower portion was partly obliterated by adhesion. The gland itself was about twice its normal size, and abnormally soft in its upper portion. The epididymis was not perceptibly enlarged and contained no nodules, nor were such found in the vas deferens. A free longitudinal incision was made in the sagittal plane of the gland, so as to lay its interior broadly open to view. This disclosed extensive pathologic changes in the gland structure proper, in the form of mild suppurative infection and partial necrosis in the upper part, while adjoining portions were the seat of undifferentiated connective tissue proliferation. These portions were freely excised, the resulting cavity treated with tincture of iodine, the remaining serous lining of the tunica vaginalis largely dissected out, and the entire cavity kept packed with iodoform gauze until it had firmly healed. In the course of about six weeks the testicle had been reduced to approximately its normal size and healing was practically complete. Microscopic examination of the excised tissue showed that it consisted of an undifferentiated mass of connective tissue, partly necrotic.

In this case we have a history and clinical picture which can be more nearly harmonized with the supposition of a traumatic causation, than in the cases previously related. An injury to the scrotum might have resulted in reaction in the serosa of the tunica vaginalis severe enough to give rise to adhesions and hydrocele, while a hematoma within the tunica albuginea and more or less crushing of the gland substance may have resulted in the conditions found within the organ. On the other hand, the statements of the patient as to the absence of all injury to neighboring parts, the absence of ecchymosis during the first week, the slow onset of the enlargement, his ability to keep at work, and his failure to make any mention of the matter to his employer until many months afterwards are considerations which may well cause one to doubt the correctness of his version of the origin of the trouble.

That both the testicle and the serous cavity in which it rests are just as vulnerable as other similar structures of the body, needs neither proof nor argument. All serous membranes, when irritated, tend to over-production of serum, which under unfavorable conditions may result in more or less permanent accumulation and distension, the most typical and probably most frequent example of which we see in hydrocele. Inflammation of a glandular and vascular organ like the testicle, contained in a so comparatively unyielding fibrous capsule as the tunica albuginea, may result in a variable amount of destruction of its substance, or in chronic enlargement, or the opposite condition, atrophy, if for any reason resolution is delayed. In case of trauma there may be a direct crushing of the gland substance or an extravasation of blood within the capsule sufficient to destroy the vitality of the parenchyma.

These are undeniable possibilities, but as a matter of experience and observation I believe them to be of exceedingly rare occurrence as the result of trauma unaccompanied by extension and evident injury of adjoining structures. In making this statement I am not losing sight of the well-known fact that injury to internal organs may be inflicted without visible injury to the overlying skin.

While the testicle is not directly protected by any bony wall, it is nevertheless strikingly shielded from direct injury by the conformation and nature of its environment, its form, consistence and manner of attachment, and the ease with which its position is changed by reason of its serous covering.

Those who have had considerable experience with injuries to the region of the perineum, lacerations of the urethra and similar accidents, will agree that traumatic orchitis as an accompaniment of such injuries is exceedingly rare. Epididymitis and orchitis do sometimes occur secondarily in this class of cases, not as the direct effect of trauma, but through infection from the wound or from the urinary tract.

Most of us are familiar with the picture of moderate traumatic injuries to the scrotum and its contents. Nearly all are accompanied by some direct evidence of trauma, such as slight or extensive ecchymosis, either immediate or appearing after a day or two; some swelling, or abrasions of adjacent skin; the distension of the tunica vaginalis and swelling of the gland moderate in degree, pain and tenderness, usually severe at first, but soon moderating under appropriate treatment; never showing the typical persistent tenderness and shape of an acute infectious epididymitis; as a rule yielding readily to proper treatment and resulting in prompt and complete recovery. I do not, of course, refer here to extensive lacerations, or other major lesions, which conform to no type.

It is in the cases which are seen late that the difficulty of determining the true causative factors arises. While a reliable history would be of the greatest assistance, some of us have learnt by experiences such as those just related to discount or reject the patient's statements in so far as they are incompatible with our clinical findings and scientific reasoning. This attitude was well expressed by the older Hebra who, speaking of the unreliability of the history in the diagnosis of syphilis, said: "Wir haben uns von der Anamnese emanzipiert." (We have emancipated ourselves from the case history.) Possibly my experience in encountering dishonest claims of this nature may have been exceptional, but I have met them in individuals in all walks of life, and of all degrees of intelligence, among the well-to-do as well as among the poor. In cases of hernia in which our clinical and operative findings disprove the patient's claim of a recent trauma as the cause, it may at least be urged as a mitigating circumstance that the claimant may have had the hernia for some time without being aware of its existence, and that it attracted his attention for the first time after some accident or strain which caused it to become suddenly aggravated; but it is hardly conceivable that a marked enlargement about the scrotum could exist for even a few days and not be discovered by its owner.

Owing to the necessity of limiting the length of this paper and insufficient time to prepare a finished discussion of the subject, the consideration of other common etiologic factors, in contradistinction to trauma, must be entirely omitted, and I am aware of the incompleteness and fragmentary nature of my remarks. I hope, however, that enough has been said to emphasize and impress the necessity of exercising great care in sifting and weighing the evidence of trauma advanced by the patient for our acceptance, and to be constantly on our guard against imposition and fraud, more especially when questions of liability and damages are likely to arise.

DIAGNOSTIC FACTORS IN URINARY CALCULI.

The *x*-ray is but one out of three indispensable means of diagnosis in cases of suspected urinary calculi. The other two are: first, a careful history and physical examination; second, a cystoscopic exploration and study of the urinary findings from bladder and kidney.—C. W. Woodall in the *Albany Medical Annals.*

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WALTER M. BRICKNER, M.D., Editor

New York, July, 1916.

CHOLECYSTECTOMY VERSUS CHOLECYSTOTOMY.

For many years the relative merits of cholecystectomy vs. cholecystotomy have been one of the prolific sources of controversy among surgeons. About twenty years ago the standard operation of cholecystotomy was supplanted by that of cholecystectomy. Then the vast importance of the gall-bladder as a source of infection was recognized; this and the slightly increased mortality of total removal of the gall-bladder led to a reaction and the older operation of simple drainage of the organ was reinstituted. Following this reaction there was a readjustment of values, and surgeons attempted to settle the problem by studying the precise indications for each operation.

The controversy is again aroused by two recent articles, each written by a surgeon of wide experience in this field of surgery. We refer to the articles by Dr. E. S. Judd of the Mayo Clinic entitled "Cholecystitis: Changes Produced by the Removal of the Gall-Bladder" (*Boston Medical Journal,* June 8, 1916) and J. B. Deaver upon "Recurrence of Symptoms After Operation for Gall Stone Disease" (*Illinois Medical Journal,* June, 1916). Both attack the problem from different angles. The first comes out definitely in favor of complete removal of the gall bladder as the method of choice; the latter, while not definitely committing himself, suggests this very strongly.

Judd's argument is based on a number of premises. 1. That cholecystitis is an infection and that systemic infection (Rosenow) is the most important avenue of infection of the gall bladder. 2. That in experimental cholecystectomy and in a few observations upon human beings, there was invariably found a dilatation of the common and hepatic ducts, and possibly of the cystic duct. This dilatation is apt to be most marked in the hepatic duct, and least in the intestinal end of the duct. Furthermore, Judd found that eventually this dilatation with increased pressure overcomes the action of the sphincter (Oddi) at the intestinal end of the duct, causing a paralysis, and the bile passes into the intestinal with little or no resistance. 3. That it is now generally recognized that pancreatitis is due to bile entering the pancreas.

Assuming, therefore, the correctness of the observations of the last two premises, Judd concludes that pancreatitis is best cured or prevented by removal of the gall bladder. He is, furthermore, confirmed in his belief of cholecystectomy as the operation of choice by the fact that in the hands of the Mayo's the operation of cholecystectomy has no greater mortality than cholecystotomy.

Of course, we must remember that in the Mayo Clinic comparatively few acute suppurative inflammations of the bile passages are operated, and that perhaps the views of their surgeons might be differently colored had they a wider operative sphere. In intestinal cases, nevertheless, the arguments of Judd must bear considerable weight.

Deaver's paper is an interesting study of 1,031 operations upon the bile passages. Of these 42 were recurrences. It is not our purpose to review the many interesting data concerning the kind and causes of these recurrences. To us the significant fact is that in 34 the recurrence followed a cholecystostomy, while in only 8 had a cholecystectomy been done. When we find in addition that in 15 of the first group the cause of the recurrence was a stone in the gall bladder (10 cases) or the common duct (5), while in cholecystectomy, a stone was found in one of the ducts in only three instances, the superiority of cholecystectomy is made doubly manifest.

Deaver believes that the advantages of the latter operation are somewhat counterbalanced by the slightly increased mortality of cholecystectomy over cholecystostomy, although he admits that he practices complete removal of the gall bladder only in the severe cases.

At all events, it seems to us that these two papers place the advantage of cholecystectomy upon a surer basis.—E. M.

THE PATHOLOGY OF APPENDICITIS.

In these days when the clinical and operative aspects of appendicitis are so well understood, a discussion of the pathology of appendicitis may appear academic. But a proper understanding of the pathology of appendicitis, just as the pathology of any disease, has an immense practical import. To recognize whether the removed appendix is diseased or normal requires an ability that is not shared as plentifully among surgeons as it should be. As a consequence, we venture to say that many appendices are held responsible for obscure intra-abdominal conditions, when a more complete exploration of the abdomen would reveal the actual condition of affairs. Furthermore, when the surgeon does recognize an appendix as diseased, he does so more by instinct than by sound scientific reasoning.

These thoughts are aroused by the paper of Moschcowitz entitled "The Pathology of Diseases of the Appendix" (Annals of Surgery, June 1916), who gives his views based upon a systematic study of 1,500 specimens. He shows, in the first place, that the entire pathology of appendicitis centers around the lesion of the acute attack, which is as characteristic and as pathognomonic as the primary lesion of syphilis. He shows that it is a definite suppurative inflammation from the very beginning and is characterized by the formation and spread of a diptheritic membrane starting from the cysts of the mucosa. He demonstrates that appendicitis is always an enterogenetic and rarely, if ever, a hematogenous infection. Of very practical significance is the demonstration that a localized peritonitis limited to the site of the inflammation is constantly present after the first twelve hours (and perhaps earlier), so that the gross absence of a localized peritonitis without any other evidence, practically excludes an acute lesion in the appendix. He, furthermore, has never seen an acute "catarrhal" inflammation of the appendix, so that this term should never be employed. The only adjective that is justified in acute lesions of the organ is the term "suppurative."

He traces the spread and genesis of the primary lesion of the appendix, and shows that there is a strong tendency upon the part of the organ to heal itself. The organ either passes into the condition of complete necrosis or if healing takes place there is desquamation of the membrane with the formation of ulcers and changes in the other coats of the appendix exactly comparable to those in other tissues where suppuration has taken place.

If the process of healing is continued, these changes eventually result in various cicatricial processes, ending in either stricture or obliteration of the whole or part of the organ. Moschcowitz does not believe that a complete *restitutio ad urtegraw* ever takes place, so that it is safe to say that a normal appendix has never been the seat of an acute attack. Moschcowitz offers some simple rules for grossly diagnosticating healed appendices, of which he regards the following two as paramount: (1) Absence of mucosal cysts and (2) widening of the submucous connective tissue zone. Both these signs are easily demonstrable upon cross-section of the organ, which Moschcowitz holds is the only logical way of examining appendices.

Moschcowitz also arrives at the significant conclusion that chronic appendicitis is not a continuous inflammation, such as a majority of other chronic inflammations of the viscera, but an end product, every stage of which can be directly traced to the ravages of the acute attack. In his opinion, there is no such lesion as chronic "catarrhal" appendicitis. It is a healed process and nothing else. He therefore suggests the following as the only reasonable classification of appendicitis: 1. Acute suppurative appendicitis. 2. Healing or subacute appendicitis. 3. Healed or chronic appendicitis.

This paper should help appreciably in clearing up many obscure points in connection with the pathology of appendicitis.

PUBLIC HEALTH EDUCATION AND SENSATIONALISM.

With a public so hungry for facts that lead to physical betterment that, in the absence of truth they swallow with avidity falsehood and quackery, how great is the surgeon's responsibility! We denounce, when we have the time, fictitious "cancer cures," nostrums that are not remedies, dramas and moving pictures, purporting to teach the facts of life and race betterment, but which, in reality, often give the half-truth even more insidious than downright falsehood, but the denunciation is carried on in *medical journals* and in *medical societies*. When, as in the case of the "Bollinger baby," the twilight sleep propaganda, and other instances of like nature, the lay press *does* get hold of facts of professional import, these facts are dissolved in sensationalism even to the point of saturation, and the fine grains of scientific truth are lost sight of. Sensationalism is the very life blood of a large per cent. of the people.

Destructive criticism is easy enough, but what is the remedy? The modern slogan "preparedness" is perhaps more apt here than elsewhere. The remedy is regular, systematic education of the laity, not when "they are up against it," but ever and always in the public press, in public lectures by surgeons and general practitioners of the greatest skill and erudition. We cannot hope, nor do we wish, to teach the public to be diagnosticians, to differentiate between carcinoma and some comparatively harmless skin affection; but what we do wish, and should accomplish, is to teach the difference between a regular practitioner working scientifically along the paths of truth, the self-exploiting quasi-scientist and the fraud-mongers who rob the community of health and substance. When one of these latter tells a patient that something which is hardly more than a pimple is a cancer and that he can cure it, and does so, the damage is confined to the patient's purse only, but when that patient tells some credulous friend who is really suffering with carcinoma, and that friend fritters away time and money, and too late comes to the realization that the disease is beyond the power to cure, the sin is grievous. Proper education should bring vividly before the public the dangers of taking risks with matters so grave.

Educational dramas and moving pictures that are intended to teach fundamentals of life and health should be passed upon by a jury of doctors that all errors and exaggerations may be eradicated. Such representations may have value, but their value consists in their strict adherence to truth. They must be beyond question. So, too, should be any article relating to health and life that appears in the lay press. Let one grain of error creep in, and the public is skeptical about the whole. The press should eschew the publications of such articles except from the pen of practitioners. They are the guardians of the health of the community and the welfare of the race, matters far too serious to be trifled with.—R. B.

Ovarian Cysts.

Don't tap or incise ovarian cysts. Whenever practicable remove them intact through a large incision.

It is now recognized that many of these cysts, though innocent in appearance, are malignant, and not a few cases have occurred in which, after ovariotomy by a small incision and trocar, the patients have returned with generalized cancer of the peritoneum owing to infection by cyst contents during the operation.

There is also a possibility that the cyst, especially if adherent to intestine, may contain pyogenic bacteria.—C. H. Whiteford in *The Medical Press,* April 12, 1916.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

Long Hours and Accidents.

In 1913 the State of Oregon passed a statute known as the Ten Hour Law. Recently the constitutionality of this law has been argued before the Supreme Court of the United States, in order to determine whether or not it violates the fourteenth amendment. In a splendid two volume brief, prepared by Josephine Goldmark and Mr. Louis Brandeis (until his nomination as Associate Justice of the Supreme Court of the United States obliged him to withdraw from the case), there is a wealth of material compiling the world's experience upon which legislation limiting the hours of labor is based. By quoting from the world's literature, they have arrayed a large volume of facts pointing out the dangers of long hours of labor to health, the health hazards of modern industry, the nature and effects of fatigue, and the bad effects of long hours on safety, morals and general welfare.

Regardless of the economic aspects, the health side of the question is of paramount importance. That the safety of workers is lessened by long hours is today beyond argument. The continued record of many years clearly illustrates the increased danger from accidents arising from fatigue, regardless of any other factor, in industry. Whether the physical surroundings be ideal or not, the strains of manufacture, such as speed or monotony of process increase the liability to fatigue. Fatigue itself influences attention, coordination and self control and lessens the inherent vitality of the worker.

The statistics of all countries and in all sections of the United States where adequate records have been kept show that the number of accidents tends to rise with the prolongation of hours of work. The most recent investigations indicate that the greatest number of accidents occur during the penultimate hour of work when attention and muscular strength are at their lowest ebb. During the last hour of work, the accident rate falls slightly, probably owing to the decrease in the rate of output and the psychological stimulation due to industry rest.

The study of accidents in the National Cash Register plant in Dayton, Ohio, shows that twice as many accidents happen in the second last hour of the morning and of the afternoon as occur during the first hour in the morning or the afternoon. The Cadillac Motor Company of Detroit for nine months shows 107 accidents in the first hour of the day and 152 accidents in the fourth hour of the day. The Industrial Commission of Wisconsin reporting the accidents in January 1913 to June 1914 recorded 737 accidents during the first hour of work, 1,805 during the fourth hour, 1,546 during the ninth hour. These suffice to show the gradual increase of accidents with the increase of the number of hours of occupation.

The Imperial Insurance Department of Germany reported in all industries that only 4.94 per cent. of persons injured had been at work less than one hour, 8.03 per cent. between one and two hours, 9.21 per cent. between two and three hours, 11.28 per cent. between three and four hours, and 12.20 per cent. between four and five hours. The number of accidents has been shown to decrease with the reduction of hours. The greater the strain on attention required by the industrial process or occupation, the more reason exists for a shortening of the working day or a more frequent interruption of the day's toil with adequate rest.

Food and rest serve as an antidote of fatigue. The labor of the machinists and most industrial workers involves muscular strength, close attention and the diligent application of brain power. Obviously, with intensity of effort or prolongation of work or both, the destruction of nerve force is increased and the organization of the body is less competent to perform its normal activities. Under such conditions fatigue ensues or even relative exhaustion, reaction time is retarded, the attention flags and accidents are more apt to follow.

Thus again is an illustration afforded of the close relation existent between social and economic conditions and the development of hospital and dispensary systems. Our courts of law are clogged with litigation growing out of accidents. Our dispensaries, hospitals and consulting rooms are thronged by multitudes, whose very presence represents a shortcoming of our social system. The five thousand dollar a bed hospital would not require as much space nor would its cost of upkeep be so great if the accident rate were lowered. It has been demonstrated that shortening of the hours of labor does not decrease the economic output of manufactured articles. The shorter hours, however, do serve to cause a marked decline in the number of accidents. If there were adequate statistics as to the use of emergency wards in hospitals, it would undoubtedly be shown that the rush hours correspond more or less with the hours of greatest incidence of accidents in industry. A study of this kind would be of immense value to those who are seeking to secure protective legislation for industrial workers.

Book Reviews

The Ductless Glandular Diseases. By Wm. Falta, Vienna. Translated and edited by Milton K. Meyers, M.D., Neurologist to the Lebanon Hospital and to the Dispensaries of the Jewish and St. Agnes Hospitals, Philadelphia, etc., etc. With a foreword by Archibald E. Garrod, M.D. (Oxon.), F.R.C.P. (London), F.R.S. Physician to St. Bartholomew's Hospital, London. *Second Edition.* Octavo; 674 pages; 101 illustrations. Philadelphia: P. Blakiston's Son & Co., 1916.

The work of Falta in its original language has for long served as a rich storehouse for those interested in the internal secretions; and it is therefore a pleasure to welcome the book in an English garb. To those unfamiliar with "Falta," it is well to state that in this book the author discusses the pathological and clinical phenomena of most of the diseases that are associated with disorders of the organs of internal secretion. While the discussion is on broad clinical lines, emphasis is obviously placed upon the relations to internal secretory changes. The book is molded upon the best Teutonic lines. It reveals a wide systematic and thorough grasp of the best literature, and a critique that nicely differentiates between the known and the disputed data. The thoroughness of the text is shown in the tabulation of 68 pages of references, all of which enters to a greater or lesser degree into the text. The translator has increased the value of the book by adding comments from American sources, which had been overlooked by the author. The translation has been ably done.

The Starvation Treatment of Diabetes. *With a Series of Graduated Diets* used at the Massachusetts General Hospital. By Lewis W. Hill, M.D., Children's Hospital, Boston and Rena S. Eckman, Dietitian, Massachusetts General Hospital, Boston. With an introduction by Richard C. Cabot, M.D. *Second Edition.* Duodecimo; 131 pages. Boston: W. M. Leonard, 1916.

Although in existence but a few years, the Allen treatment has already had a wide acceptance, and will probably become a routine in the management of diabetes. In this little brochure, the details of the treatment are given in full; with diet lists and methods of preparation that have been successfully worked out in the Massachusetts General Hospital. A smaller first edition was reviewed in these columns.

Books Received

The Mortality from Cancer Throughout the World. By Frederick L. Hoffman, LL.D., F.A.S.A., Statistician, The Prudential Insurance Company of America; Chairman, Committee on Statistics, American Society for the Control of Cancer; Member American Association for Cancer Research, etc. Octavo; 826 pages. Newark, N. J.: The Prudential Press, 1915.

A Manual of Gynecology and Pelvic Surgery for Students and Practitioners. By Roland E. Skeel, A.M., M.S., M.D., Associate Professor of Gynecology, Medical School of Western Reserve University; Visiting Surgeon and Gynecologist to St. Luke's Hospital, Cleveland; Fellow of the American Association of Obstetricians and Gynecologists, etc. Duodecimo; 680 pages; 289 illustrations. Philadelphia: P. Blakiston's Son & Co., 1916. $3.00 net

Tobacco Habit Easily Conquered: How to Do It Agreeably and Without Drugs. With Appendix: "Tobacco, the Destroyer." By M. MAC LEVY, author of "Back to Life," etc. Duodecimo; 157 pages. New York: ALBRO SOCIETY, INC., 1916.

Elements of Active-Principle Therapeutics. By J. M. FRENCH, M.D. Duodecimo; 128 pages. Chicago: THE ABBOTT PRESS, 1916.

Lateral Curvature of the Spine and Round Shoulders. By ROBERT W. LOVETT, M.D., John B. and Buckminster Brown, Professor of Orthopedic Surgery, Harvard University Medical School; Surgeon to the Children's Hospital, Boston; Surgeon-in-Chief to the Massachusetts Hospital School, Canton; Consulting Orthopedic Surgeon to the Boston Dispensary, etc. *Third Edition*, revised and enlarged. Octavo; 213 pages; 180 illustrations. Philadelphia: P. BLAKISTON'S SONS & COMPANY, 1916. $1.75, net.

Man an Adaptive Mechanism. By GEORGE W. CRILE, F.A.C.S., Professor of Surgery, School of Medicine, Western Reserve University; Visiting Surgeon to the Lakeside Hospital, Cleveland. Edited by ANNETTE AUSTIN, A.B. Octavo; 387 pages; 88 illustrations. New York: THE MACMILLAN COMPANY, 1916.

Traité de Gynécologie. Par FORGUE ET MASSABUAU, Professeurs à la Faculté de Medicine de Montpelier. 1 vol. gr. in-8; 928 pages; 286 figures, noire et coloriés. Paris: J. B. BAILLIERES ET FILS, 1916. 25 francs.

Progress in Surgery

A Résumé of Recent Literature.

Umbilical Dyspepsia. C. D. AARON, Detroit. *Journal American Medical Association*, May 13, 1916.

Congenital defect of the abdominal wall at the navel is, according to Aaron, a rather common occurrence. Only when there is protrusion do we regard it as a hernia which, however, may be produced in these cases by anything causing increased abdominal pressure. This umbilical opening may be very small and escape notice. It is always congenital. All these patients have symptoms of nervous dyspepsia due to increased irritability of the autonomic nervous system. They may be free from the symptoms for days and have them recur from some trivial cause. The appetite is apt to be capricious. Fulness of the head, headache, vertigo, lassitude and depression may be complained of, as well as uneasy sensations one or two hours after meals or a heavy feeling immediately after eating. The patient is usually constipated, but the nutrition is good, though loss of weight may result from voluntary refusal of food. Palpation with the ball of the finger over the umbilicus causes severe pain which may radiate in different directions or be referred to some distant part of the abdomen. The stomach may functionate normally, but hyperacidity is sometimes present and chemical examination of stomach contents shows hyperacidity in all cases. The principal idea of treatment is to eliminate irritation of the patent umbilicus. The following directions are given by Aaron: "This is best accomplished by bringing the edges of this congenital opening as close together as possible with adhesive plaster 2 inches wide and long enough to extend from 2½ to 4 inches on either side of the umbilical opening. The surface of the abdomen where this is to be applied is thoroughly cleansed with soap, water and alcohol. One must be particularly careful that the umbilicus itself is well cleansed. If there is an excessive growth of hair on the abdomen, it is shaved off with a safety razor. I have found this instrument much more satisfactory than the ordinary razor. The first piece of adhesive is applied in the following manner: The edges of the navel are approximated by an assistant, and the strip of adhesive is applied directly over the umbilicus and drawn as tightly as possible. Without an assistant the binding can be done by applying the adhesive to one side of the abdomen and then pressing with the hand on the opposite side, and fastening the other end of the plaster to this side. The puckering of the skin in the midline is smoothed away. The remaining two strips of plaster are fastened so as to overlap the central strip above and below. In this manner we have been able to give almost immediate relief from pain and the distressing symptoms. The patient is able to take his bath in the same manner to which he has been accustomed, as the adhesive is very resistant to the action of water. Its removal when loose is facilitated by the use of ether or oil of wintergreen. This treatment is usually continued from four to ten weeks. On removal of the adhesive, one will often find vesicles and sometimes pustules in the area which has been covered. A single application of tincture of iodin over this area will go far toward clearing up these eruptions. If necessary, application of the adhesive may be discontinued for several days at a time." These eruptions usually yield to tincture of iodin. An elastic abdominal support is a valuable adjunct to the treatment.

Duodenal Ulcer. STRAUSS and LEVA. *Jahreskurse fuer aerztliche Fortbildung*, March, 1916.

The American viewpoint (Mayo, Moynihan, etc.) is being rapidly accepted, though many still doubt the frequency of the disease, and some still claim that gastric ulcer exceeds in frequency the duodenal. This depends to a great extent on how one classifies pyloric and juxtapyloric ulcers. The association of chronic appendicitis with duodenal ulcer is noted, Kümmel claiming that chronic appendicitis is associated with 75 per cent. of ulcers. Strauss says that rebellious forms of hypersecretion or hyperacidity speak for a parapyloric ulcer. *X*-ray shows normal motility in 40 to 50 per cent., hastened motility in 30 to 40 per cent.

The association of neurotic symptoms with ulcer is noted, Von Bergmann speaking of disturbed motor, secretory and sensory control.

Treatment: Surgery restricted to cases with stenosis or repeated bleeding or perforations. Other cases should have prolonged treatment with restricted diet, medication, rest, etc. Kümmel thinks surgical end-results better than with gastric ulcer cases. The necessity for "ulcer treatment" after operation is much emphasized (Strauss).

The Radiographic Picture in Gastric and Duodenal Ulcer. The *x*-ray is only a means in diagnosis and the report should be so interpreted. Repeated pictures and fluoroscopic exposures should be taken, and the report confirmed only if there is correspondence and permanence in the findings.

The characteristic symptoms are:

1. Antiperistalsis.
2. Increased peristalsis and motility with six-hour residue.
3. Hypertony.
4. Mechanical deformation of the stomach by scars.
5. "Nischen syndrome."
6. Hour-glass stomach, true and spastic.
7. Enlarged and deformed duodenal bulb (Cole).
8. Delay in emptying of duodenum.
9. Displacement of pylorus to the right.
10. Fixation of pylorus on massage and change of position.
11. Localization of pressure point.

Occult Bleeding. Considerable reliance is still placed on occult bleeding. Phenolphthalein test not so reliable or delicate as the benzidin test.

The blood test is valuable as indicative of open ulcer; negative results point to closed or healed ulcer. Occult blood test is not reliable as differential between ulcer and cholecystitis since in the latter it may occasionally be positive. Bleeding in carcinoma is more common and constant.

Excision vs. Gastro-Enterostomy. Van Buren Knott in *The Saint Paul Medical Journal,* June, 1916.

Knott contends that, although gastro-enterostomy has become an almost routine practice in the treatment of gastric and duodenal ulcers by good surgeons, it is frequently employed where indications for its employment do not exist. It is therefore coming into disfavor, rather because of its abuse than because of its proper and legitimate use. His reason for protesting against the employment of gastro-enterostomy in many instances is that statistics from large clinics show that seventy per cent. of cases of cancer of the stomach are the outgrowth of old ulcers.

Except in the pyloric region, ulcers are not excised as frequently as they should be, he thinks. The fact that patients treated by gastro-enterostomy require a second operation for the removal of the ulcer should be well noted. Ulcers situated upon the anterior surface of the stomach and not involving the curvatures may be readily excised and should, in practically every instance, be so treated.

If several ulcers are present in the pyloric region or if the thickening and induration are extreme, pylorectomy should be performed, but this should be only where the pyloric involvement is quite general.

Ulcers upon the posterior wall of the stomach may be excised, either by employing the rotation method of Summers' or the transgastric method of Chaput, Deaver and others.

Gastro-enterostomy may, however, be frequently necessary as a supplementary procedure.

Post-Operative Ileus. William M. Thompson, *Surgery, Gynecology and Obstetrics,* June, 1916.

The mortality following inflammatory ileus as in cases of pyosalpinx with pelvic abscess, pelvic appendicitis with abscess and extensive adhesions is so high that any measure calculated to lessen it is acceptable. In the experience of the author—and in this he only confirms the conviction of many others—the best results in the treatment of inflammatory ileus is by enterostomy and drainage. This is especially of life-saving value in cases that are so ill that medical measures would be fatal. The adhesions should not be disturbed in doing the enterostomy. When recovery takes place the enterostomy opening may be closed by doing an ileo-ileal anastomosis and a cecostomy or appendicostomy will complete the cure. In favorable cases these procedures may be combined in the first instance for drainage and to relieve the back pressure in the colon. Restoration to function may be accomplished even after vascular changes have taken place. It is better to put the damaged gut at rest by short circuiting than risk life by the more serious resection.

The Value of Deep Percussion in the Diagnosis of Subacute Intra-Abdominal Disease. H. Neuhof, New York. *Archives of Diagnosis,* April, 1916.

In subacute and subsidiary intra-abdominal affections, especially in obese individuals and those in whom by ordinary palpation no tenderness can be elicited, Neuhof practices deep percussion and has found it valuable. There are two ways to make deep percussion: 1. By ordinary percussion as in chest examinations. 2. Tapping the abdominal wall with the crooked finger. By these methods Neuhof has frequently discovered a limited area of tenderness which indicates the site of the organ involved.

Bleeding Nipples. Dean Lewis, *Surgery, Gynecology and Obstetrics,* June, 1916.

Bleeding nipples are most frequently associated with intracanalicular papillary cystadenomata and the adenocystic type of chronic mastitis. The discharge is serohemorrhagic, hemorrhagic or brownish and cannot be taken as indicative of malignancy. In the opinion of the author as well as Rodman, this symptom is associated with papillary cystadenomata, which in themselves are the result of involution changes.

Sex Gland Implantation: Additional Cases and Conclusions. G. F. Lydston, Chicago. *Journal American Medical Association,* May 13, 1916.

Lydston reports three cases additional to those previously published by him and his conclusions to date in regard to the implantation of the sexual glands. His conclusions, in substance, are as follows: For hormone therapy purposes, successful total or partial hetero-implantation of human sex glands is practicable in either sex. By successful he means the formation of a new blood supply and more or less prolonged existence of the gland with hormone production. The prospect of success from anastomotic implantation at present is not brilliant. Glands from the living subject are most desirable, though rarely obtainable, and those from the healthy dead body taken before the beginning of decomposition are of value. The glands of the male can be successfully implanted in the female and the reverse is probable, but the female tissues are apparently more hospitable. The physiologic and therapeutic results are independent of the site of implantation, but the vicinity of the peritoneum and canal of Nuck in the female and the tunica vaginalis in the male are sites of election. The blood pressure apparently is modified, and senility may possibly be delayed and longevity increased. It is probable that arteriosclerosis in its early stages may be benefited and senile dementia may be benefited. The climacteric may probably be postponed and defective psychic or physical or sex development are definite indications for the operation and certain psychopathies such as dementia praecox may possibly be benefited by implantation. Chronic diseases of the skin due to or modified by nutritional disturbances may be benefited and possibly cured. All conditions incidental to sex gland mutilation in either sex afford positive indications, benefit being probably inversely as the length of time that has elapsed and the age at which it occurred. In properly selected cases successful implantation ought to increase physiologic activity with all its benefits, and all morbid conditions in which malnutrition exists are likely to be benefited by sex hormones.

Thorium: A New Agent for Pyelography. J. E. Burns, Baltimore. *Johns Hopkins Medical Bulletin,* June, 1916.

The chief objection against collargol is that it is an irritant when it escapes into the tissues; indeed, a number of deaths have been reported following its use. Burns has been experimenting with various solutions of thorium and has devised a solution which in his opinion is ideal for purposes of pyelography. He has used it in 125 cases and no untoward effects have been observed. He concludes:

1. Thorium solution fulfills all the conditions necessary for an ideal pyelographic medium.

2. Clinically, there has never been the slightest evidence of toxicity in a series of one hundred and twenty-five cases, the amounts used in a single case varying from a few cubic centimeters to almost a liter. This alone is proof of its non-toxicity.

3. Experimentally, although in a few instances death has followed the injection of large doses into the peritoneal cavity and tissues of animals, larger doses intraperitoneally and intravenously have produced no ill effects.

4. That the solution is non-irritating is shown by the absence of urinary symptoms after its use, and the absolute lack of any such evidence cytoscopically, and at operation.

5. The pyelograms and cystograms made with this solution show a splendid shadow which possesses an unusual clearness of delineation.

6. The solution is clear and watery; therefore it possesses a great degree of fluidity, permitting its ready elimination from the urinary tract.

7. It is perfectly clean and does not stain the linen. In this particular it possesses another marked advantage over other solutions, particularly those of the silver salts.

8. It is quite inexpensive, being about one-third as costly as collargol.

Variations in Renal Function Dependent on Surgical Procedures. D. F. Cameron, Minneapolis. *Journal American Medical Association*, June 3, 1916.

The results of an investigation of changes in renal function produced by operations performed under general anesthesia and of the various changes in renal activity dependent on the relief from back-pressure of urine are reported by Cameron. The rate of excretion of phenolsulphonephthalein and the concentration of urea in the blood are taken as indexes of renal activity. They were chosen because of their recognized value and because of the easy performance of the tests. The following is the author's summary of these results: "The agreement between phenolsulphonephthalein and blood urea tests is, as a rule, very striking, though not infrequently a low phenolsulphonephthalein excretion is associated with a normal or only moderately increased blood urea concentration. These tests are of great importance in selecting the most opportune time for operation so far as renal function is concerned. Following an operation under a general anesthetic there is, as a rule, an increase in blood urea concentration. This increase is most marked after operations on the urinary tract and especially on patients who already have diminished renal function. In a small series of cases this increase was slightly more marked following operations under gas-oxygen-ether anesthesia than following similar operations under ether. Blood urea determinations are of great value in the diagnosis and prognosis of uremic states. Not infrequently blood urea concentration can be determined when other renal function tests are very difficult or impossible."

Supernumerary Ureter. Report of a Case of Complete Unilateral Duplication. A. R. Simon and H. O. Mertz, Laporte, Ind. *Journal American Medical Association*, May 27, 1916.

A case of complete unilateral duplication of the ureter is reported by Simon and Mertz, who discuss the importance and surgical significance of the condition and its detection. The symptomatology is not sufficient for this, but the cystoscope will show many such cases, and there is always some irregularity in the bladder picture. If the opening of the third ureter is obscured by mucus, as in the case reported, or occurs among the folds of the trigon or vesicle neck, chromoureteroscopy may be necessary. The Roentgen ray alone may suggest the anomaly, but not give an accurate diagnosis. It is most often the ureter draining the cephalic pelvis which has the abnormally placed opening, which is usually lower and nearer the mid line conforming to Weigert's rule. The following are the author's conclusions: "1. Supernumerary ureters are more common than generally appreciated by the clinician. 2. They may be productive of a pathologic condition demanding surgical correction. 3. An otherwise benign condition may be rendered malignant through the association with a supernumerary ureter. 4. Their recognition is possible in every case. 5. In our case, the unilateral duplication had a direct bearing on the progress of the pathologic process."

Hexamine as a Urinary Antiseptic. J. W. Thomson Walker, M.B., London. *Medical Press & Circular*, April 5, 1916.

A study of the chemistry of hexamine in the urine leads to the following conclusions as to its use:

(a) In acute bacillus coli infection: Urinary antiseptics should not be used in the acute stage. Alkalies must be given till the urine is alkaline and this must be continued for three to four days. The temperature becoming normal, if infection is still evident in the urine, hexamine should be given and increased in dosage till the limit of tolerance is reached. In acute acid cystitis the use of urinary antiseptics of the formaldehyde group is to be deprecated, since irritation of the bladder results.

(b) Alkaline cystitis: Here hexamine can have no action and the urine must therefore first be rendered acid by acid sodium benzoate or ammonium benzoate. Boric acid may be used to advantage. When the urine has been rendered alkaline hexamine is added.

Simple Subparietal Rupture of the Kidney. F. Gregory Connell, *Surgery, Gynecology and Obstetrics*, June, 1916.

Subparietal rupture of the kidney may occur without associated shock, injury to other organs and external evidence of trauma. The diagnosis is frequently made by the history of abdominal contusion followed by tenderness, rigidity and hematuria. This is not the case when there is only slight injury; on the other hand serious injury to the kidney sometimes escapes detection. In this event only exploratory incision can determine the true nature of the lesion. Expectant treatment should only be carried out when there is fairly positive proof of the absence of serious injury. Nephrectomy should be reserved for very extensive lesion of the organ or for late cases. In the majority of early cases conservative treatment, preferably by suture, is the proper indication.

Hereditary Syphilis as an Etiological Factor in Spurs on the Os Calcis. Paul B. Swett and H. F. Stoll, *Surgery, Gynecology and Obstetrics*, June, 1916.

Nine cases of spurs on the os calcis form the basis of this paper. In a certain proportion of these cases the authors have found sufficient evidence to lead them to the conclusion that the inflammatory process is one traceable to hereditary lues. The pain due to the inflammation disappears under treatment. They differ from Murphy, who claims that the lesion is due to an accompanying bursitis. Operation of these spurs of the luetic type is indicated only when they cause pain by mechanical pressure on adjoining tissues.

The Technique and Results of the Open Method of Operation on Bones and Joints. C. H. McKenna, Chicago. *Journal American Medical Association*, May 13, 1916.

The subject of the open or closed method of the treatment of fractures is specially taken up by McKenna, who endorses Albee's opinions that the open method should not be employed except by specialists and with exact and precise technic and the greatest possible perfection and adaptation of instruments. As regards the final points of technic, he insists on the careful preparation of the limb by shaving and washing with green soap, alcohol and ether before operation, and after drying, dry boric powder covered with sterile gauze is applied forty-eight hours preceding the operation. Three coats of iodin are applied to the dry surface just before operation. All material used must come directly from the sterilizer and not be touched by the gloved hands of doctors or nurses. Nothing but instruments and sponges should be allowed inside the wound. The skin in all cases is closed with silkworm gut suture. Open operations should never be performed until Roentgen examinations or consultation, or both, conclusively show that good results cannot be obtained otherwise. The lack of resistance to infection of bone tissue requires special technic not needed in ordinary surgery and the introduction of foreign substances like nails and plates should be avoided if possible. In cases with marked deformity, however, they may be essential. The bone implant or autotransplant with intact periosteum intact in indicated cases should be the material of choice for the surgical reconstruction of fractures. The intact periosteum is needed for the greatest protection of the nutrition of the graft.

Laminectomy With Simple Exposure of the Cord: Its Effect on the Reflexes and on the Symptoms of Spinal Disease. C. A. Elsberg and Pearce Bailey, New York. *Journal American Medical Association*, June 10, 1916.

The effects of laminectomy with simple exposure of the spinal cord in a number of cases with more or less severe spinal symptoms are described by Elsberg and Bailey. In 1912 they had published a paper on the subject under the title of "Spinal Decompression," but in only two of the cases was there really an actual increase of intradural pressure found. In his present article they treat of cases in which there is no question of compression, and in which the exposure itself is the only agency to account for the change in symptoms produced and which admit of no other conclusion. In many cases the spinal reflexes are almost immediately affected, becoming markedly depressed or disappearing altogether within thirty minutes, and the depression or disappearance persisting from six to twenty-four hours. Trauma of the cord, since frequently there is no injury to the cord appreciable and the same effects often follow simple spinal puncture, cannot explain the matter. They mention instances in which marked improvement, though often temporary, occurred from the procedure and several cases of recovery after this simple operation in patients suffering from multiple sclerosis, syphilitic paraplegia, occurred. The conclusions offered from their experience are as follows: "1. The free removal of spinous processes and laminae with opening of the dura, in the absence of increased intradural pressure or a discoverable lesion, may be followed by a disappearance of normal cutaneous and tendon reflexes for a number of hours, or may be followed by the temporary return to the normal of pathologic reflexes. 2. The operation of laminectomy may have a profound effect in certain pathologic states of the spinal cord and may so modify or check the disease that a return to normal conditions is even possible. 3. On account of the relative safety of laminectomy in experienced hands, except in the region of the conus and cauda equina, and for the reasons stated above, exploratory operations should be done more often."

Some of the Surgical Aspects of Painful Back. W. E. Shackleton, Chicago. *Journal American Medical Association*, May 20, 1916.

Shackleton discusses some of the surgical aspects of painful backs, a condition more common than is generally supposed and a potent factor in the causation of sciatica, scoliosis and backache in patients who have been treated medically for lumbago, rheumatism, and sciatica without relief, as well as surgically for cord tumors and Pott's disease and supposed pelvic and abdominal conditions and tumors of the cord. The cause of the pain and disability in these cases is an anatomic variation in the size or shape of the transverse process of the fifth lumbar vertebra, sometimes spoken of as the lumbar rib, which occurs about as often as other anatomic variations. In the majority of cases the conditions are undoubtedly acquired during years of hard labor in unnatural postures and they are more common in middle adult life and among the male sex, though cases have been reported in patients of an early age. Occupation, while a frequent cause, is not the only one. Fractures and syphilitic growths are also probably to be considered as sharing in its etiology. The pain is not always produced in the same way. It may be caused by impingement of the process on the ilium and the transverse process may act as a fulcrum separating the sacrolumbar joints. In one case of Adams, it was due to the result of constant friction eroding the ilium. The anatomical details in regard to the course and distribution of the fifth lumbar nerve are described. Shackleton has found but twenty cases reported in the literature and adds three, two of them already operated on and the other one still under observation. The results of operation were most gratifying.

Hallux Valgus. C. F. Painter, Boston. Boston *Medical and Surgical Journal*, May 4, 1916.

Painter reviews the pathology of hallux valgus and concludes that hallux valgus is not an exostosis of the metatarsal head, but is a simple lateral deviation of the great toe, accompanied by stretching of the internal capsular ligaments. The treatment, therefore, is simple. If the deformity can be corrected manually, an attempt should be made to correct it by mechanical means, employing night splints to adduct the toe; toe posts in the day time and proper shoes. If of long duration, operation is usually necessary. Painter recommends the Huter operation, consisting in removal of the head of the metatarsal bone, combined, when necessary, with removal of the enlarged bursa. In order to overcome the tendency of the phalanx to ride up after removal, Painter applies a metal splint for some weeks after operation, until the capsule has so shrunk as to hold the bone in place.

Results from Blood Transfusion in the Treatment of Anemia and the Hemorrhagic Diseases. E. W. Peterson, New York. *Journal of the American Medical Association*, April 22, 1916.

The results from blood transfusion in severe posthemorrhagic anemia and hemorrhagic disease are discussed by Peterson, whose interest in the subject was aroused by the benefits obtained from the method in a case of severe postpartum hemorrhage. After a transfusion which, as Hartwell has pointed out, should be considered a homologous transplantation of tissues, the recipient's blood will show an increase in red cells, in hemoglobin, and decrease of coagulation time. It is indicated, therefore, in hemorrhages of various types, in selected cases of anemia, and in toxic and septic conditions. The results obtained by it in thirty-four transfusions in twenty-three cases and from four intramuscular injections of blood are reported. The cases treated included those of hemophilia and purpura, as well as direct or secondary hemorrhage. Case reports are given of some of these conditions. The general results are summarized substantially as follows: Transfusion of blood, intramuscular injections of whole blood and intravenous and subcutaneous injections of homologous serum are the most efficient measures, in the order named, in the treatment of hemorrhage and hemorrhagic diseases. In severe cases of acute posthemorrhagic anemia blood transfusion is the best and sometimes the only efficient means of preventing death. In chronic posthemorrhagic anemia, provided the cause of bleeding is removed or remedied, no other measure will compare in efficacy in producing hematopoietic stimulation. In pathologic hemorrhage transfusion has often proved effective after other measures have failed and should be resorted to in cases that do not respond properly to simpler methods.

An Experimental Study of the Use of Sodium Citrate in the Transfusion of Blood by the Direct and Indirect Methods. Wm. S. Carter, Galveston, *Southern Medical Journal*, May, 1916.

Carter carefully reviews the literature on transfusion and then gives his own experimental work on animals which leads him to the following conclusions:

Sodium citrate is a satisfactory anti-coagulant when used in the cylinder for direct transfusion in two per cent. solution. Transfusion can be continued from 2.5 to 3 times longer with a two per cent. citrate solution than can be done with physiological solution.

A solution of sodium citrate is as efficient as one of hirudin, as shown by the amount of blood transfused or by the time of transfusion.

Sodium citrate does not lessen the coagulability of the blood and is not toxic in the amount used either for direct or indirect transfusion.

The coagulability of the blood is temporarily increased immediately after transfusion in which citrate is used, either by the direct or the indirect methods.

The lethal dose of sodium citrate in dogs is about 1.0 gram per kilo of body weight when dilute solutions are injected. Even when a concentrated solution is used it is not more than 0.5 gram per kilo. A 0.2 or 0.3 per cent. solution is sufficient to prevent coagulation and does not have any toxic effect in the amount used for indirect transfusion in man.

The Importance of Auscultation in the Diagnosis of the Vascular Injuries Accompanying Gunshot Wounds. G. Makins. *The Lancet*, April 15, 1916.

Makins reports three cases in which auscultation of the vessel revealed an artino-venous aneurism before the other characteristic signs of the aneurism appeared. Makins suggests, therefore, that auscultation be carried out as a routine procedure in multiple gunshot wounds of the limbs.

The Treatment of Nevus Flammeus (Port Wine Mark) and Allied Conditions by Filtered Violet Rays, Employing the Compression Method of Application. W. L. Clark, Philadelphia. *Therapeutic* Gazette, May 15, 1916.

Clark reports ten cases, and, if we may judge by the illustrations, the results are brilliant. For details of technic, the reader is referred to the original paper. Clark concludes as follows:

1. "Port-wine" nevi, telangiectases, rosacea, and other superficial vascular skin lesions may be treated with good cosmetic results.
2. Powerful ultra-violet rays with screens to filter out the red, yellow, and green, and compression by means of a quartz lens, are necessary for success.
3. The treatment will improve scars caused by caustic agents sometimes used to treat these lesions.
4. Failure may be due to imperfect technic, carbon adhering to the quartz enclosing the mercury or to the lens.
5. Nevi which fade upon pressure respond more rapidly than those which do not fade, though both types are quite amenable to treatment. All nevi do not react with equal promptness. When there is a complication of thickened connective tissue, prolonged treatment is necessary.
6. Young children respond more rapidly than adults, because the skin and vessel walls are thinner and less mature, hence the activity of the rays is augmented.
7. Enlargement of features, such as lip, nose, etc., due to blood engorgement, sometimes complicating "port-wine" nevi, are reduced by this method.
8. Brunettes require more prolonged treatment than blonds on account of the resistance offered to the rays by the skin pigment.
9. Healthy skin is more susceptible to ultra-violet rays than abnormal skin, and must be protected.
10. This is a safe method for patient and operator.

The Treatment of Intractable Pruritus Ani by Local Anesthetic Methods. W. E. Ground, Superior, Wis., *The Journal-Lancet,* April 15, 1916.

The author recommends the local injection of quinin and urea hydrochloride. He precedes this by purgation, local disinfection and local anaesthesia by cocain. He injects a 1 per cent. solution of the quinin salt about one inch from the anal margin on a level with the ischial tuberosity. Three injections of a dram each are made at the same sitting, the result being relief for from two to four weeks or some times permanent cure. The details of the method are given.

Cancer of the Lip. W. W. Grant, Denver. *Journal of the American Medical Association,* April 29.

Grant insists on its early radical excision as giving the only promise of permanent relief and describes his method of operating. The removal of the diseased lip will be the first step, and the sooner this is done the less the danger of distributing the virus by the subsequent manipulations. Safety demands wide excision and as complete removal as possible of submaxillary glands and lymph nodes, regardless of evidence of their being involved. The V incision has no place in surgery unless with a very small growth in a large mouth. The semilunar incision is objectionable, even in small superficial ulcers, for it leaves a depression at the site of the disease and, like the V incision, does not afford the most satisfactory conditions for reconstructing the mouth. The operation is best which involves the fewest incisions for complete work and replaces the diseased lip by soft elastic tissue resembling the original as near as possible with the best cosmetic results. The stationary chin tissue is of great importance as a point of fixation for the sliding flaps, which constitute the reconstructed mouth, and Grant rejects the methods of making the chin flaps of the leading authorities. He again expresses the opinion that his method published in 1899 is the best operative procedure and reproduces the technic in detail. No condition probably requires more attentive and skilful after-treatment. The first dressing should be changed in from twenty-four to thirty-six hours and repeated at these intervals through the week, the mouth being irrigated through the T tube with warm boric acid and normal salt solution. The patient should be nourished with liquids through a feeding tube until the stitches are removed, after a week or ten days.

Tuberculosis of the Mammary Gland. Dr. Gatewood, Chicago, *Interstate Medical Journal,* April, 1916.

A survey of the available literature leads the author to the following conclusions:

1. Tuberculosis of the mammary gland is very uncommon considering the frequency of tuberculosis.
2. The term "primary tuberculous mastitis" should be applied only to those cases in which there is definite evidence that the infection was introduced directly into the breast tissues.
3. The symptoms are varied and the diagnosis should be made certain by the aid of the microscope before radical operations are undertaken.
4. The pathology, although varied, does not differ essentially from that of tuberculosis in other organs.
5. The treatment is surgical in almost every instance, but the post operative care of the patient is very essential to complete recovery.
6. The prognosis is excellent provided the general condition of the patient is good.

The Treatment of Tuberculous Adenitis by the Roentgen Rays. R. H. Boggs, Pittsburgh. *New York Medical Journal,* May 27, 1916.

Boggs believes that the x-ray is the method of choice in the treatment of tuberculous adenitis. It is better to use a hard tube and administer small doses over a longer period of time than to try to heal the process by a few treatments with massive doses. Boggs advocates the x-ray even in cases that have come to suppuration. The conventional hygienic measures should not be neglected.

Dermoid Tumors of the Mouth. P. K. Gilman, *Surgery, Gynecology and Obstetrics,* June, 1916.

The author reports a case of a dermoid cyst of the mouth occurring in a Filipino woman 26 years of age. The growth had practically filled the mouth, displacing the tongue upwards and backwards so that its tip was barely seen when protruded as far as possible. Its great size precluded the possibility of determining its origin either from the submental or the sublingual space. There was deglutition difficulty in speech and respiratory embarrassment. The patient had also emaciated considerably. Attempt to remove the growth en masse failed on account of its intimate relation with neighboring structures. The cyst contents were evacuated, a part of the cyst wall removed and the remainder was carbolized. The cavity was packed with gauze. The patient made an uneventful recovery, regaining her weight as the diet was increased. The differentiation from ranula is made chiefly on the ground of the more doughy consistence of the dermoid cyst and its medium situation.

Presenile Gangrene — Thrombo-Angiitis Obliterans. C. Goodman and E. P. Bernstein, New York. *New York Medical Journal,* June 3, 1916.

Based upon the observation that this disease is most common in those countries in which typhus fever is prevalent, Goodman conceived the possibility that typhus fever may be the cause of thrombo-angiitis obliterans. To test this view Bernstein made complement fixations of the blood against the recently discovered cause of typhus, the bacillus of Platz, in 21 cases. In three the test was positive in high dilutions. The small percentage of positive results is suggestive, inasmuch as it is well known that patients with typhus may lose their serological reactions within as short a period as five months after the termination of the disease. In many of these patients, Bernstein believes the reaction would be positive if the cases had been studied earlier.

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SURGICAL MORTALITY FROM THE STANDPOINT OF THE ANESTHETIST.*

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The position of anesthetist is somewhat peculiar in that he may be said to be the lookout of the surgical team. His duty consists not merely in a careful administration of the anesthetic but in constantly taking soundings, so to speak, in order that the navigator of the surgical ship may be informed as to whether he proceeds in safety or approaches the shallows. Watching, weighing, analyzing, estimating, the man who sits at the head of the operating table, if he thinks at all, must necessarily receive some rather definite impressions concerning the factors influencing our surgical mortality.

In attempting to deal with impressions received in this manner the present paper may not offer anything new, but the subject of surgical mortality touches us all very closely and if this very inadequate discussion serves but to fix attention upon some things which we do not think about enough, or perhaps forget entirely, then it will have been worth while.

In our day disease must indeed be firmly and hopelessly intrenched to escape surgical attack. And certainly, with the average surgical risk and with the exercise of average present day surgical care we may at least expect to escape casualties in surgical attempts which in days, not so very long gone by, would almost certainly have resulted in the death of the patient. These average cases, however, do not constitute the usual source of our surgical mortality, consequently they do not interest us especially at this time. It is those cases which require not average but extraordinary care and precautions and judgment that we are now to consider; those cases which *may* die in spite of all we can do, which are almost *sure* to die if we err. Do we save as many of these people as we should? As we could? This is the field where the *real triumphs* of surgery are to be won, where the deepest gratification from success is to be obtained, and yet we often lose not only desparate cases but many which *seemed* to have at least a fair expectation of recovery. What is the reason?

In thinking these things over I have become persuaded that it is not in our actual operative procedures that we err most frequently. Indeed the trouble with most of us is that this particular part of the work obsesses us and in our enthusiasm for the operation and ITS details we do not allow proper weight to certain important fundamental considerations upon which success many times depends. With minds intent upon what from custom we have come to regard as *the* thing of importance we are apt to forget, for example, that every step of our surgical procedure is depressant to vital resistance; that every individual can endure but so much and no more; that in the last analysis no patient will live if the factors making for safety, which constitute the sum of his resisting powers, are outweighed by those opposing; and that in conserving vital resistance our safety lies. Now the operation *is* the most important thing, but nevertheless I am afraid we lose many of the cases which die because of non-attention to some accessory detail which, though perhaps not ordinarily regarded as of vital import, has proved of sufficient weight to turn a somewhat delicate balance and determine the question of death or recovery.

Some little thing such as a few lost minutes somewhere, a little too much undertaken; some neglected measure of precaution against the effects of trauma or shock or hemorrhage or exposure, an unwise selection of an anesthetic, submission to faulty operating room routine, has probably proved to be the last straw and worked our undoing.

To paraphrase the scriptural text concerning the three Christian graces, I should say that from the anesthetist's point of observation the three Surgical graces are Information, Preparation and Conservation, and the greatest of these is *Conservation.*

If asked to summarize the reasons for the majority of our unexpected surgical deaths I should say something like this:

We do not routinely use all the means at our command to ascertain the resisting power of the patient, and with something like a proper estimate of this in mind from the outset, adopt and adhere to a policy of management best calculated to conserve his natural resistance that it may be turned to account in effecting recovery.

If asked to be more specific I should say that some of our weakest points are these:

1. We do not sufficiently study individual vital resistance.
2. We make inadequate or obsolete provision against the onset of shock.
3. Our selection of an anesthetic is often made without due consideration of what its ultimate effects may be.
4. We are guilty at times of excessive traumatism.
5. We lose valuable time in our operating rooms because of non-essentials and unpreparedness.

While the great majority of our surgical cases are *average* cases and recover in spite of all these things

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* Read during the Organization Meeting of the Interstate Association of Anesthetists, Cincinnati, O., May 4-5, 1915.

I would speak upon the foregoing points a little more in detail.

As upon the stage the *play's* the thing and the actor's technic comes second so upon our stage the *patient* is the thing and everything else follows after. Our first important duty is the study of the patient before operation with a view to determining not merely the nature and extent of the disease, but also, as nearly as possible, how far nature can be depended upon, with such assistance as we can give it, to take care of the consequences of surgical interference with her vital processes in the effort to cure disease. We do not always do this, but we should.

There is, unfortunately, no definite, sure criterion to guide us with certainty to a wise judgment in this respect. But while this is true, we have the lessons of experience, tongues to interrogate, eyes to observe and catch warning signals, physiological and pathological knowledge, laboratories and instruments of precision (including the blood-pressure apparatus and the kidney functional test), and the consistent use of these information gatherers will many times bring out revelations of conditions entirely unsuspected by the patient but which, if unknown to the surgeon, might lead to grave error. Hence we should omit no means of examination that promised any assistance in a comprehensive analysis of the case to the end that we may decide definitely if possible *what needs* to be done, how it may be done with least injury to the patient, whether the patient can endure that injury and recover, and then prepare for what is necessary so that there may be no indecision, hitch or delay from causes that could have been anticipated.

It seems superfluous to mention these things, but in surgery we are handling human lives, and we are now speaking of the factors entering into surgical mortality, and it must be admitted that in practice we sometimes operate upon persons whom we have never even seen before meeting them in the operating room. It would appear that as a measure of prudence and general protection, and as the just due of all our cases, we should work out and closely adhere to a careful scheme of procedure, before, during, and after operation for all cases alike, those presumably good and those obviously bad, modifying it only when circumstances demand. There is no denying that such a course taken routinely imposes a considerable burden upon us, involving much work and taking much time, but if it even *occasionally* leads to a discovery that would modify management in a single important detail then it should be held justified and necessary. On the other hand if we do *not* follow a routine we leave a disciplinary loophole through which error and failure and vain regret are sure to creep sooner or later.

SHOCK.

Approaching the operation the question of our defences against the factor of shock presents itself. In this shock, country land of malignant mystery, resides the evil genius of the surgeon, and there seems to be no road for the surgeon's patient to travel which must not penetrate its dread confines or at least cross its borders. The several theories as to the production of shock we will not attempt to discuss in this paper. It is with the prevention of shock that we are most concerned since this is more important than treatment. Skirmish or pitched battle. We *know* that we will have to combat this enemy and it is better policy to strike the first blow than to fight desperately in a ditch.

The experimental researches of Crile have convincingly demonstrated the serious physiological effects of psychic shock and have shown beyond question what actual cell damage great dread may accomplish. Many times have we seen the clinical effects of this in the stormy convalescence of a victim of extreme pre-operative fright. Traumatism is not the only influence which will exhaust the functional activity of the cell or even destroy it entirely. Now to prevent the occurrence of psychic shock we must begin before its cause begins to operate, and certainly this is as far back as the first announcement to the patient that an operation is desirable. Those individuals who are so phlegmatic and unafraid that this factor is negligible are very few. We are much more likely to meet with persons who, if they have reason to suspect that they will require an operation, will postpone what to them is an evil day and not consult a surgeon until absolutely driven by necessity for relief. Indeed, I doubt not that most of us, familiar as we are with the vicissitudes of surgery, would be staggered if we knew that we faced a major operation. And the reason is *fear*—fear of *death*. There can be no other emotion so disturbing. It shakes the average organism like an earthquake. Here, then, our treatment of shock should begin, and here is where we usually begin to make mistakes. We do not meet this condition seriously and *allay fear* and failing to do so we assume a handicap at the outset. With this in mind we must make it a point to reassure, and we must learn to do it in a way that will inspire courage, and confidence in the outcome. No effort should be spared to do this. It is worth while. Remove the fear of the anesthetic, which not a few dread more than the operation. The horror of complete unconsciousness and absolute helplessness while something is being done that may cost life itself is a very real one to many people. Give the anesthetist an opportunity to win confidence and establish a desirable understanding, so that when he meets the frightened patient in the operating room he will mean something more to the patient than a total stranger who feels no personal interest and who says and does just what he would say and do in any other case. My experience leads me to believe that if we gave due attention to the patient's mental condition we would in some cases save life, in many cases save much suffering, in most cases save money as represented by hospital days and in all cases contribute much to our patient's comfort and satisfaction.

Traumatic shock arising during the course of the operation is one of the most important contributors to our surgical mortality, and will be spoken of as distinct from the depression of vitality due to such causes as a toxic anesthetic, or loss of blood, or overexertion from resistance, or mechanical interference with respiration, though certainly traumatism, in combination with all these things, tends to bring on the exhaustion which is the forerunner of collapse.

What operative procedures are most productive of traumatic shock? To begin with, a hacking skin incision rather than a clean, quick cut with a sharp scalpel. Then may follow a long list, such as crushing and dragging of nerves; handling and exposure of intestines; pulling on the mesentery; pressure on liver or spleen; traction on gall-bladder or uterus; dragging on stomach; squeezing of ovaries or testicles; roughness with retractors; massage of the patietal peritoneum with packing sponges—all these things produce shock. No one can be more alive to the fact than the watchful anesthetist. It is he who notes the falling blood-pressure, the quickening pulse and the increased rapidity of respiration, and it is he who is most keenly conscious of the fact that the condition progresses as time passes and the trauma continues.

How is it to be prevented, or held in check? Very largely I am sure by the *velvet hand* style of surgery and the development of a good technic in the use of a local anesthetic to block the sensory nerves in the field of operation. The entire operating corps should have in mind what manipulations are most productive of traumatic shock and be governed accordingly. Bloodgood and McKesson have urged the more general use of the blood-pressure apparatus as an indicator of shock. Unquestionably it is much more reliable than the best educated finger on the pulse can possibly be. Besides all concerned (not merely the anesthetist) would thus be constantly kept in closer touch with the state of affairs. But to the anesthetist, watching anxiously the progress of a critical case, the greatest surgery, (other qualities being anything like equal), is that which is distinguished by the greatest gentleness of touch and manipulation, and I am far from feeling sure that there is any other one quality in the surgeon of greater importance to the patient. The surgical signs of the times indicate that it will be a characteristic of the surgery of the future.

The question has often arisen as to whether pushing the anesthetic when unusual trauma is to be inflicted reduces the shock. Keen, in his work on surgery, remarks that many hold that in a critical operation when the patient is to be subjected to great shock, such as the things I have mentioned, the anesthetic should be pushed in order that the nervous system might be so obtunded that shock would not be felt. The logic of this is difficult to understand because we know that the action of ether is not such as to prevent the registration of impulses in the brain, certainly until we approach the lethal dose, although the patient may have been deprived of the power to signal resistance by its action on the cortex. So if we adopt this procedure we have only succeeded in adding to the shock the exhaustion produced by an overwhelming drugging. Furthermore this is what we have to pay for absolute relaxation obtained in the old way. Is it worth the price? Can we not secure it by less harmful means.

THE ANESTHETIC.

In recent years much progress has been made by wide experimental work in scientific anesthesia, by the more general development of capable anesthetists and by the creation of greater interest among surgeons. Further progress will come as the result of more general enlightenment on the subject of anesthetic pathology. There *is* such a thing as anesthetic pathology. We are coming to have much more respect for anesthesia than formerly, and especially are we apt to feel this respect working in us if we happen to have a notion that it may be necessary to submit ourselves to it. Nevertheless it is a fact that very many do not appear to *take in* the truth that instead of constituting a mere interim between two periods of consciousness it is a serious physiological condition involving cell changes carrying grave possibilities affecting the life and future health of the patient.

However, our present interest concerns the relation of anesthesia to surgical mortality. Simpson

(1), in this connection, recently expressed himself as follows:

> "Probably one third of our deaths could be attributed to the disturbing effect of the anesthetic on metabolism, i. e., its influence on the liver and kidneys. The more we know of acetone bodies and the effect of metabolic disturbance the more do I believe that the anesthetic and its effects on metabolism will probably be found to cause a high percentage of the deaths that occur."

The old time conception of an anesthetic death is that of one occurring practically on the table, though the anesthetic may be, and often is entirely guiltless, such an unfortunate occurrence being no more necessarily due to the anesthetic than whatever may come later is surely a consequence of the operation. Now a death occurring as the result of disturbed metabolism by anesthesia would only come as a more or less remote *after effect*, and would probably be erroneously attributed to something other than the anesthetic. *But* if anesthesia is by any possibility responsible for *anything like* 33 per cent. of our surgical deaths it becomes a vastly different proposition from the idea many of us have held regarding it and from what our statistics would lead us to believe. If the anesthetic substances we have been in the habit of using are capable of bringing about changes which kill one third of the cases we lose then it is high time we became alive to the fact and look about for something less harmful and fatal. The general anesthetic most commonly used to day is ether, and the question comes squarely before us: *Is there any good reason to believe that ether can produce such serious effects as to be responsible for so many so-called surgical deaths?*

What do we know about ether? That it is believed to produce anesthesia by a chemical solution of the lipoid substances of the brain cells. Incidentally it also attacks other lipoids with which it is brought into contact—the lecethin of the red blood cells causing a temporary anemia, the lipoids of the white blood cells thereby disturbing phagocytosis and thus lowering resistance to acute infection, also the specialized fats of the liver, kidneys and other organs, thus interfering with normal metabolism and elimination. The action of ether on these fats has been shown experimentally.

An evidence of disturbed metabolism is the great frequency of post etherization acetonuria. How many of us routinely take precautions to guard against acute acetonemia? But what surgeon of large experience has not lost cases or at least had to deal with severe symptoms of acid intoxication following operation? In view of the chemical derivation of acetone bodies their presence is probably an expression of abnormal fat destruction, and the frequency of acetonuria following etherization considered in connection with the theory of lipoid solution by ether suggests more than a coincidence. The literature on the subject is extensive. Dr. Lewis Beesley, after two years investigation chiefly at the Royal Hospital for Sick Children, Edinburg, concluded among other things that "*both ether and chloroform invariably produce a temporary acute acetonemia. Acute acetonemia is accompanied by symptoms of acid intoxication, sometimes ending in death when the kidneys are unable to cope with the increased formation of acetone; a guarded prognosis must always be given when acute acetonemia is present with symptoms of poisoning.*" It would be interesting to analyze the literature on this subject more completely and show its frequency and seriousness, but we are trying to cover too much ground in a short time. The whole trend of it, however, tends to confirm the writer quoted. The presence of acetonuria means disturbance of metabolism, especially in the liver. The pathology is some degree of fatty degeneration of the liver, kidneys and muscles.

The relation between anesthesia and shock has not been definitely determined, but that certain anesthetics do increase the effects of shock by their depressing toxicity there can be no manner of doubt. One of Crile's experiments, comparing ether with nitrous oxide-oxygen in the effort to determine this factor is interesting. Ten dogs were taken in each of two groups. The first ten were given ether by the drop method and shock produced by rubbing the peritoneum for three hours. The second group were given N_2O with O and shock produced in the same manner. Blood pressure tracings were taken to determine the reaction. The ether dogs at the end of three hours showed an average pressure of 10 mm. of Hg., whereas the N_2O dogs showed 110 mm. of Hg. The difference is certainly striking, be the explanation what it may.

Now let us make the application to our subject of surgical mortality which we have conceded is almost entirely confined to those cases which are handicapped in some particular. If, in dealing with these persons, we use for anesthesia a substance which will cause anemia, lower resistance to infection, produce more or less grave metabolic disturbance and in all probability add much to the effects of surgical shock, why then possibly Simpson may not be far wrong when he says that a third of our surgical deaths may be attributed to the anesthetic without injustice. Certainly a little earnest study of the effects of anesthetics, both immediate and remote, increases our respect for the possibilities of ether, cautions us to be careful of its selection and use especially in patients with a low grade of resistance, warns us against its early repetition in any case, and suggests an explanation of postetherization symptoms which have not been any too well understood.

The alternative to ether as a general anesthetic is N_2O with O. I am aware of no authority on the subject who does not admit that this combination involves less danger to the patient than any other we have at our command. From the patient's standpoint it is as nearly perfect an anesthetic as we can well expect to obtain. Most of us know something about it from experience. It is believed to act solely by interference with the use of oxygen by the brain cells. No one has been able to show any material detrimental effect upon the organs of the body, and we are all aware how quickly it is eliminated. Logically, therefore, if it *can* be used it *should* be, because of its freedom from all those influences which go so far to determine mortality. Certainly it should be used when the odds are against recovery, though to confine its use to this class of cases seems hardly fair to the anesthetic. Its danger is a matter of technic in administration and can be controlled. On the other hand the after effects of ether once it is given, like a word once spoken, are beyond our power for good or evil. As has been well said there is no fool-proof anesthetic. The principle objection to the routine use of gas and oxygen lies in the fact that even when preceded by morphin complete relaxation may not always be possible, and sufficient relaxation is a requisite in abdominal work. Crile and others have demonstrated the practicability of gas in a large majority of abdominal cases, however, and Crile's mortality report of 0.8 per cent. in a thousand miscellaneous cases is a pretty low record.

There is this to say, however, in regard to gas and oxygen—if we expect to use it in abdominal surgery without disappointment except in selected cases of low vitality or with flabby abdomens, if we are going to give our patients generally the benefit of the anesthetic which is least harmful to them, it will be necessary for the surgeon and the anesthetist to get together, develop a technic similar to Crile's, and with a mutual understanding of the needs of the situation and the possibilities of the anesthetic, harmoniously cooperate with each other in the interest of the patient. By so doing most cases, whatever the operation, could be given the benefit of this excellent anesthetic. In those cases where ether was necessary it could be used in minimum quantities and discontinued when the exigencies of the case permit. Team work is always important, though we must admit that we don't always have it. But it is especially important when the anesthetic is gas and oxygen. Many anesthetic difficulties, even when using ether, are due to unexpected (hence unprepared for) manipulations, and are most apt to occur when the anesthetist is carefully nursing a case along with as little of the drug as possible. The trouble with us is we do not properly appreciate the advantages of gas to the patient, ether is so much easier to use and we have the ether habit. Perhaps we are influenced by a desire to save him a few dollars for the increased cost of the gas, letting him endure the difference in discomfort, take his chances as to other complications from ether, and if he has to pay for more hospital days why we can't help that.

In conclusion a few words on the relation existing between the patient's power of endurance and the factor of *time*, time selected for, and time consumed in operation, as it bears on surgical mortality. In such conditions as acute appendicitis, intestinal obstruction or perforation, the time relief if attempted with relation to onset may decide the question of success. Here there is an opportune moment which if allowed to pass unimproved multiplies many times the chances against recovery. This critical moment may have been allowed to pass through no fault of ours, sometimes this happens through our own bad judgment. Again, in other cases, where the question of lack of resistance is a serious one, by doing a single severe operation in two stages (which is sometimes practicable), or by declining to combine two operations in one, thus dividing the forces of the enemy, so to speak, we may display good generalship. As for time consumed in various ways during operation, who is there among us who has not seen numbers of cases hold up well through a fairly long period and go to pieces in the last few minutes of the operation. Now there are many ways in which these few vital minutes may have been *thrown away* which readily occur to us after the mischief is done, just as there are ways of conserving time and the patient's vitality which also occur to us, but which, we must admit we do not always practice. In consequence cases which have no vitality to throw away may be lost and we scarcely appreciate the reason for it. Time is a factor which tells mightily when a person is approaching the limit of his resisting power. Our operating room habits and customs and methods should be revised and refined with no lost motions and no lost minutes as the objects to be attained, because we face situations in the operating room time and time again when lost motions and lost minutes mean lost lives as we all know well enough.

The individual who studies the causes of surgical mortality largely from the viewpoint of the anesthetist, who keeps in touch with the very important work being done along the line of physiological and pathological effects of different anesthetics, who has observed closely and thoughtfully in all sorts of patients the contest of the vital forces against the combination of disease, surgical trauma and anesthetic drugs, who has watched the rally and retreat and often noted with anxiety what seemed to be the final turning point down grade, may perhaps acquire a bias of judgment and come to interpret many surgical fatalities from the standpoint of the anesthetist alone, but certainly he cannot escape the conviction that we would approach much nearer to the attainment of all that is possible in our results if, while striving to perfect our operating technic, the necessity for more attention to the minor points, the side issues (so called), were also kept in mind. Rifle bullets kill more soldiers than twelve inch projectiles.

Genius has been said to consist in an infinite capacity for little things. I believe it was Angelo who said, while working painstakingly on the big toe of his statue of Moses—"Trifles make up perfection, but perfection is no trifle."

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ETHYL CHLORID ANESTHESIA.*

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The subject allotted to me is one in which I am very greatly interested, yet one which few anesthetists, comparatively, know very much about. Hence the history of this drug, which I consider one of the most useful of all the agents used for anesthetic purposes, should be of great interest to physicians and dentists who make anesthesia a special study.

Ethyl chlorid (sweet spirit of salt) was first obtained in alcoholic solution by Basil Valentine; Flauber referred to it in 1648. In 1749 Ludolff stated that, on heating alcohol with sulphuric acid and sodium chlorid, a distilate was obtained which, when treated with lime, yielded an ether, but he endeavored in vain to obtain a similar compound by the action of hydrogen chlorid on alcohol. Woulfe obtained the preparation in this way and it was afterwards prepared and sold by an apothecary in Germany under the name of Basse's hydrochloric ether. This was in 1801.

Flourens drew attention to the anesthetic properties of ethyl chlorid in 1847, and Heyfelder in the following year first administered the vapor of this substance for a surgical operation. Although his administrations were quite successful, it was not until the year 1896 that ethyl chlorid became a recognized anesthetic. Unsatisfactory symptoms often accompanied its administration, previous to 1895. These effects were attributed to imperfection in its manufacture and the consequent presence of impurities. Since 1895 it has rapidly gained in favor, attributable to the improved methods of administration and to an increase in knowledge of its properties and physiological action, and to improvement in its manufacture. It may be regarded as ethyl alcohol ($C.H._3$ $C.H._2$ $O.H.$) in which the O.H. is replaced by C.L.

Ethyl alcohol is the raw product from which it is usually made. Ethyl chlorid is the result of treating acetic and other ethers with hydrogen chlorid. In actual practice, ethyl alcohol is mixed with hydrogen chlorid, which acts as a dessicating agent. Impurities may be found, yet if pure hydrogen chlorid be used there is little danger from this source. The quality of alcohol used is of great importance. The report, after an examination of seven different makes of ethyl chlorid, states that it should be free from water, foreign chlorids, acids, aldehyds, ether, alcohol and organo-metallic substances. It is, however, purified by passing the vapor through water, dilute caustic solution, and then concentrated sulphuric acid. This treatment is intended to free it from alcohol, hydrogen chlorid and water.

It is a colorless mobile liquid and is exceedingly volatile. It possesses a sweetish taste, and a pungent, yet fragrant "ethereal" odor. It is inflammable, burning, when ignited, with a smoky green edged flame, producing fumes of hydrogen chlorid; hence care must be exercised in using it near an open flame or a hot cautery. It even decomposes when near a hot bulb or electric light. It does not freeze at 29 degrees C.; it possesses a boiling point of +12.6 degrees C. Owing to its extreme volatility, it cannot be kept in ordinary bottles, except at a temperature below +10 degrees C., and then it must be exceptionally well stoppered. It is furnished to the market in sealed tubes filled under considerable pressure.

In many instances, uncertain results have been encountered by those using ethyl chlorid for general anesthesia and these have been attributed in some cases to impurities that were present and were later detected chemically. In such cases the original product must have been improperly purified, for the conditions essential for the decomposition of ethyl chlorid involve oxygen, and there is no way for oxygen to enter the tube after it is ready to dispense. The detection of impurities in ethyl chlorid presents many difficulties which are not encountered in the examination of ethyl ether or chloroform, and as Gwathmey states, it is indeed quite fortunate that it can be prepared with such a degree of purity.

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ITS EFFECTS UPON THE RESPIRATORY, CIRCULATORY AND NERVOUS SYSTEMS.

According to Muller, the effect of this drug on the lungs is pathological, rather than physiological. Ethyl chlorid has been used very extensively by some anesthetists, especially in short operations, and as a preliminary to ether and chloroform anesthesias in longer operations, and it is found that it rapidly produces general anesthesia. In some cases respirations cease and in others convulsive movements supervene. According to Hewitt, Kemp found stertor, difficult respiration, tremors and convulsive movements of the legs.

In my own experience, which has been quite extensive, I find with pure ethyl chlorid for general anesthesias there is no strangling sensation, excepting in very nervous patients. The respirations are not labored at first, the heart action is quickened. After a few inspirations the respirations quicken, showing the patient is passing into the first stage of anesthesia; the muscles become rigid and in some cases are in a state of tonic or may be clonic spasm. This condition may interfere materially with respiration, causing it to become quite labored and in many instances to cease. Under such conditions we have cyanosis and what resembles a paralysis of the respiratory center. If the administrator continues the drug, or is unusually slow in re-establishing a patent respiratory passage, there will be brought on a paralysis of the respiratory center, a weakening of the heart action and a condition resembling death, if not death itself.

Koenig found that the rapidity of narcosis depended on the degree of dilution with air. A mixture of 10 per cent. ethyl chlorid vapor with 90 per cent. air caused narcosis in small animals at the end of six or seven minutes; 50 per cent. mixtures rapidly caused narcosis lasting for some minutes. Pure ethyl chlorid vapor caused regular and rapid lowering of arterial pressure ending in respiratory and cardiac arrest. W. Webster found small doses of ethyl chlorid caused augmentation of the respiratory movements and lowering of the blood pressure during narcosis. The heart beat was at first decreased and then increased. With large doses the breathing ceased some time before the heart stopped.

All authorities agree that ethyl chlorid is taken up by the blood with great rapidity, that it is eliminated rapidly, and that under surgical narcosis a very great fall in blood pressure is noted.

Embley says the effect of ethyl chlorid on the heart muscle is paralytic. He further states that the effect on the arterioles isolated from the central nervous system, is relaxation. Both the above effects are similar to those from choloroform, only it takes about 19 times as much ethyl chlorid to produce the same results. Embley also found that the action of ethyl chlorid on the vascular system caused dilatation. This theory coincides with that of Buxton, who claims ethyl chlorid causes a flushing of the face, due to dilatation of the peripheral vessels, which accounts for the fall of blood pressure accompanying ethyl chlorid anesthesia.

The circulatory changes are always secondary to the respiratory. The effect of ethyl chlorid on the nervous system is not so important, as only a small amount of this drug enters the cerebrum and ganglionic cells, because it is so slightly soluble in the cell juice, hence insufficient to produce paralysis of the cells.

EFFECTS ON MUSCULATURE.

Although the centers of pain sensation may be paralyzed, the quantities do not always suffice to paralyze the more resistance centers. As a result the reflexes and the muscles are not completely paralyzed, inhibited or relaxed in the anesthesia. The muscular system seems to be about the most stubborn. Muscular rigidity is always present in the stage of excitement. In some cases, according to Hewitt, muscular relaxation accompanies stertor, but there is more often rigidity. This rigidity in some subjects may be so great as to culminate in opisthotonos. The great tendency to contraction of the masseter muscles has been noticed, so much so at times to be really dangerous, causing an obstruction of the respiratory tract. I have found it in many cases necessary to place a mouth gag or a block between the teeth before beginning the anesthesia. I have also experienced the opisthotonos state several times in the beginning of the anesthesia. The effects of this agent upon the glandular system are a diminution of the secretions of the kidneys and liver. The gastric and intestinal functions seem to be only slightly influenced.

From the experimental work of the physiologists and practical experience, we must agree with Hewin that ethyl chlorid may prove fatal in two ways, (1) by simple overdose, ethyl chlorid toxemia or syncope; and (2) by intercurrent respiratory embarrassment (asphyxia).

With the first cause we have pallor, pulselessness, arrest of breathing, wide dilatation of the pupils, general muscular flaccidity and separation of the lids, and cardiac arrest.

According to Hewitt, in death from asphyxia, the embarrassed respiration may depress a heart already weak from the drug itself. Prominent symptoms of this death are spasms about the jaws, mouth, tongue, larynx, or respiratory muscles. There is an arrest of breathing with some cyanosis, followed by cardiac arrest.

THE STAGES OF ETHYL CHLORID ANESTHESIA.

Concerning the different stages of ethyl chlorid anesthesia, we may say that it differs little from any other pulmonary anesthetic. The first stage of course is the analgesic state coming on after very few breaths, and is of very short duration. Following at once is the stage of stertor and considerable spasmodic action of most the entire muscular system. The jaws are set and in many robust subjects there appears at this time tonic or clonic convulsions of the muscular system in general. There is one drug that comes nearer to a specific for this condition than any other yet found in my experience; this, however, will be discussed later.

Gwathmey, in his description of the second stage, mentions the fact that we not only find true anesthesia, but that after the mask is removed from the face anesthesia is deepened owing to the absorption of the ethyl chlorid from the lower air passages. This may be true to a certain extent, but a practical view as to the cause of this deepened anesthetic state is that oxygen has been allowed to enter the lungs by raising the mask or by forcing oxygen into the inhaler at the time of an inspiration.

The third stage is again one of analgesia as is the first.

The fourth, when administration has been carried too far and there is complete cessation of respiration, arrest of the heart and death.

The first stage lasts from one-half to one minute; abscesses may be opened at this time.

In the second stage, which lasts from one to three or four minutes, any minor operation may be performed. The anesthetic may be safely continued in this stage for a considerable length of time, if administered by one familiar with the amount and the symptoms that may at any moment appear. I think the longest time I have carried a patient in this second stage has been one-half hour; many times from 10 to 15 minutes.

In the third stage, lasting about the same length as the first, there seems to be no sensation to pain, yet the patient may talk.

In prolonged ethyl chlorid narcosis, Muller recognizes four stages. The first and second he claims are very brief, which is of course true, providing the anesthetic is stopped when the second stage is reached, but in my opinion prolonged anesthesias are carried entirely in the second stage if the anesthesia is a perfect one; of course, under such conditions neither the third stage should be allowed by raising the mask nor should the fourth stage by any means be allowed to supervene by carrying the anesthesia to the stage of paralysis of the respiratory center followed by cardiac arrest. I like the classification of Herrenknecht (as quoted by Gwathmey), which is the following: (1) The prenarcotic analgesic state. (2) The stage of excitement. (3) The stage of deep sleep. (4) The post narcotic analgesic state. His classification is found in anesthesias given as they should be, not in those given as they frequently are. My experience coincides nearly identically with that of Herrenknecht.

The third stage of my anesthesias with ethyl chlorid, a continuation of the second stage of Gwathmey's classification, is that of deep sleep, especially since I have adopted the routine plan of giving oxygen with this agent. I think oxygen has made ethyl chlorid anesthesias less toxic and I seldom have any stage of excitement or spasmodic muscular contractions since adopting this method. I do not use the oxygen, however, when using ethyl chlorid as a preliminary to ether or chloroform, which by the way is my method in all such anesthesias. The signs of an overdose are (1) very widely dilated and fixed pupils, eyelids open; (2) great pallor; (3) intermittent respirations or gasping for breath.

Ethyl chlorid, from observations made by different men, is not eliminated in the undecomposed state, the chlorin, at least, disappearing from the expired air. At any rate, according to Lotheissen, ethyl chlorid does not remain fixed for any length of time, so that it cannot exert any prolonged narcotizing effect, which is a great advantage when asphyxia threatens.

Elimination takes place mostly from the lungs; in fact, almost entirely so in brief anesthesias, because so little is absorbed by the blood. Kidneys and other excretory organs enter into the elimination in prolonged operations. The after effects are not of much consequence. There seems to be no albumin in the urine. Ethyl chlorid exerts no injurious action upon the blood corpuscles and the kidneys. Clinically the after effects depend upon the preparation of the patient, the length of the administration and the method employed.

There is more or less vomiting in a great per cent. of cases, which does not, however, last long, and is associated with considerable headache. Erotic sensations are more liable to occur with ethyl chlorid than with other anesthetic agents, excepting nitrous oxid.

Collapse seems to be very liable to follow this anesthetic, more so, I think, than any other.

COMPARISON OF ETHYL CHLORID WITH OTHER ANESTHETIC AGENTS.

The narcotic power is similar to that of ether, but weaker than chloroform. Because of its rapidity in destroying consciousness and its evanescent effect it is very similar to nitrous oxid. Maass, who is an opponent of ethyl chlorid narcosis, maintains that in regard to danger it is at least equal to chloroform. I most certainly agree with him as regards to the use of ethyl chlorid for an anesthesia of any length, or one requiring any special degree of relaxation, and especially if administered by one not accustomed to its varying effects.

Anesthetists who refer to the use of chloroform as a preliminary to ether are evidently ignorant of the great value of ethyl chlorid as such preliminary. There is no comparison of the two agents in my estimation. The greatest danger in the use of chloroform is in the first and second stages of anesthesia, when the patient is breathing rapidly and in a state, usually, of excitement.

Maass condemns ethyl chlorid as a preliminary to chloroform and goes still further and claims it is an added danger in the beginning of ether narcosis; hence it is evident that Maass is considerably prejudiced or else is not fully acquainted with the advantages of this agent.

Ethyl chlorid is a very valuable anesthetic or analgesic in parturition, because usually at the time when forceps are applied, the patient is in a state of more or less exhaustion, hence a small amount of anesthetic is required. On the battlefield ethyl chlorid is specially indicated, because soldiers awaken sooner and more completely from this agent than from ether or chloroform, and it causes less shock to the wounded.

The advantages of ethyl chlorid over other liquid inhalation anesthetics are the rapidity with which it produces anesthesia and usually the absence of after effects. We all know ethyl chlorid can never replace chloroform or ether where loss of sensation is required for a prolonged period. My experience with ethyl chlorid coincides with that of Herrenknecht, who concludes it is the least dangerous narcotic which we possess at present, not excepting nitrous oxid. This statement of course applies to anesthesias of short duration.

The inhalation should always be interrupted with the disappearance of reflexes and the onset of muscular relaxation. When any dangerous symptoms appear they are with the respiratory apparatus rather than the circulatory.

Hewitt thinks it is far more dangerous than nitrous oxid and distinctly more so than ether, his reason being the pronounced fall of blood pressure which takes place. Boyle says it cannot be compared to nitrous oxid and oxygen, and rates its dangers as equal to those of chloroform. Luke and Ross state it is safer as an anesthetic agent than ether, chloroform, or ethyl bromid, but not as safe as nitrous oxid. Behr indicates as special advantages of ethyl chlorid the relative harmlessness of the drug when used in suitable cases; its pleasant odor, the absence in most cases of excitement, the rapid induction of the anesthesia, the speedy return to consciousness and practically a total absence of after effects. Children, according to all the authorities, are the best subjects for the administration of ethyl chlorid. I have never used ethyl chlorid as an anesthetic in very young children except as a preliminary, yet it is claimed by some authorities to be a good anesthetic in children as young as a few days, being especially well borne by infants from a few weeks to a few months old, up to about eight years. They take it quietly and without difficulty, losing consciousness in 10 to 30 seconds. It gives a very satisfactory anesthesia lasting from one to one and a half minutes. I have used it frequently in adenoid and tonsil operations, but prefer to follow with a little ether.

I realize that in cases where there is much edema or swelling about the neck it must be given with great care and as little in amount as possible. My principal injunction, I wish to emphasize, is that ethyl chlorid is more satisfactorily given with a continuous flow of pure oxygen. Lotheissen has proposed an improvement in ethyl chlorid narcosis by a simultaneous inhalation of pure oxygen and ethyl chlorid. I have been using this combination with extreme satisfaction for over a year. Previous to this time I used straight ethyl chlorid and because of the fact that many of my patients, after a few inhalations, developed a tonic and clonic spasmodic action of the muscular system and in some instances bordered on to opisthotonos, I began to think of some method to eliminate these disagreeable symptoms. Knowing the power of oxygen to eliminate the spasmodic action of ether from anoxemia, and that chloroform was less toxic when given with it, I tried the oxygen and ethyl chlorid sequence, which has, to my great satisfaction, made this form of narcosis a very efficient one. The apparatus used is my own ether inhaler, which has an oxygen attachment on one side, to which the tube from a low pressure tank is attached.

In closing I will mention a few facts:

(1) Surgical anesthesia is established, according to Gwathmey, in about eight minutes. In my own experience this time is reduced to possibly two minutes or less.

(2) The stage of excitement, if any, is of very short duration.

(3) Complete anesthesia, having been gradually induced, the pulse is full and slow and respiration regular, not stertorous. In my experience I find the pulse full but considerably quickened, and the respirations rapid and frequently stertorous. When used in sequence with ether, the pulse becomes quiet when ether is commenced.

(4) In no instance has there been an increase in saliva or bronchial mucus during narcosis.

(5) The face presents a healthy color, no pallor or cyanosis.

(6) If too little of the anesthetic is given, the patient will gag or vomit; if too much is given, respiration will become shallow, and eventually, if more is given, will stop altogether, but the pulse is not interfered with; in other words, as I have said before, the respiratory, and not the circulatory, center is affected first by an overdose. The tendency, all through the narcosis, is to recovery rather than profound anesthesia.

(7) After the anesthetic has been stopped, the patient soon comes to, frequently while yet on the table; if he sleeps longer, it is usually from a preliminary of morphin and scopolamin.

(8) Vomiting, slight, occurs in a small percentage of cases after recovery. It is not, however, prolonged or of a distressing type.

(9) After effects, as bronchitis, pneumonia, or nephritis, are not seen.

(10) Patients having serious valvular cardiac lesions, chronic pulmonary affections, diabetes, profound anemia or other complications, stand this anesthetic well.

(11) The quantity used is generally small.

1520 Menlo Place.

DISCUSSION.

Dr Martin M Ware, New York City: In discussing Dr. Rice's paper, I hope I will be pardoned for referring to my personal experience by way of rounding out his admirable exposition of ethyl chlorid anesthesia. As a pioneer in the use of ethyl chlorid for general anesthesia I experienced many of the rebuffs which the originators of newer methods have always had to contend with and in addition the prejudices in favor of the more strongly entrenched anesthetics, such as chloroform, ether and nitrous oxid, with their endorsement of prolonged usage The mortality rate of ethyl chlorid became the vital issue in its acceptance as a routine method of anesthesia. Personally I have been able to review 15,000 administrations without fatality. While deaths from its use have been reported, the causative factor, upon thorough examination of the reported cases, has invariably been found to have been something else than the anesthetic. What few deaths have occurred have been associated with grave pathological conditions which rendered the persons operated extremely hazardous risks.

Dr. Rice emphasizes the occurrence of respiratory paralysis after prolonged administration. I should rather say after excessive dosage. Ethyl chlorid, like all other anesthetics, kills by respiratory paralysis, if its administration is pushed far enough.

Ethyl chlorid, during its administration, requires a liberal admixture of air, or as Dr Rice suggests, oxygen. The control of the plane of narcosis by mechanical devices is to be deplored, as the safe and successful administration of ethyl chlorid requires the exercise of gray matter

While there is an excitement period with ethyl chlorid if administered without sufficient air or oxygen, and tonic or clonic spasms of the musculature may result, I maintain that these untoward occurrences are less frequent under ethyl chlorid than nitrous oxid. A trismus of the masseter muscles, connected with disease of the last molars, will yield to ethyl chlorid when it will not relax from nitrous oxid.

I know of no anesthetic agent from which the patient, narcotized to the fullest degree, will so promptly awaken and fully recover in so brief a time.

While ethyl chlorid is not especially advantageous for prolonged administrations, it is the ideal anesthetic for brief narcosis and for anesthesia in emergency surgery

It need scarcely be reiterated that a pure product must be used.

The concomitant use of oxygen offers possibilities of developing a satisfactory and accurate method for its prolonged administration, that may prove sufficiently inexpensive not to be prohibitive.

TO THE READERS OF THE SUPPLEMENT

¶ Forthcoming issues of the Supplement will contain contributions from the following notable authorities in anesthesia and analgesia:

¶ W. D. Gatch, C. W Moots, G. W Crile, F C. Mann, A. H. Miller, F. Wayne Babcock, Jos. C. Bloodgood, F. G. DuBose, D. E. Jackson, Truman Brophy, Kurt Thoma, Rich. H. Keithmuller, Jos. E. Lumbard, Evarts Graham, Moses Salzer, Ira O Denman, Hugh W MacMillan and N. T. Yager.

SOME BASIC PRINCIPLES OF GENERAL ANESTHESIA.*

CARL G. PARSONS, M.D.,
Fellow of the American Association of Anesthetists and Lecturer on Anesthetics, University of Denver, Dental Department.
DENVER, COLO.

There are certain basic principles of anesthesia which we, as anesthetists, should have firmly fixed in mind, not only to insure our own clinical success, but more especially to safeguard the welfare of our patients. I have tabulated these basic principles of anesthesia previously (*Denver Medical Times*, July, 1911), but they are now presented in detail and are as follows:

1. The gradual administration of anesthesia with continuous, equal drug-distribution.
2. Percentage limitation of vapor concentration.
3. Maintenance of a patent airway to prevent embarrassment of respiration or circulation.
4. Differentiation of pupil reflexes.
5. Routine method of resuscitation in emergencies.

THE GRADUAL ADMINISTRATION OF ANESTHESIA, WITH CONTINUOUS, EQUAL DRUG-DISTRIBUTION.

The induction of anesthesia with undue haste is dangerous to the patient. When an anesthetic agent is inhaled there takes place in the nerve cells and centers certain physico-chemical changes, which cause cellular disarrangement. Now, if the induction of anesthesia be too rapid, these structures are overwhelmed, and if sudden death does not occur, various disagreeable symptoms may present.

Speaking of chloroform, Hewitt says that: "In a large proportion of accidents, overdosage, in the usual sense of the term, is conspicuously absent."

Of course, he here refers to the deaths which are seen early in anesthetization, either from a too rapid administration or from reflex inhibitory phenomena, and other conditions which are noted later.

I know of no better way to present this important principle than to quote partly from an article which I once wrote, entitled "The Law of Anesthetic Accommodation":

"During the induction of anesthesia, if the administration is conducted gradually and uniformly, the following results obtain:

"The anesthetic is safer. Syncopal attacks are minimized, especially when using chloroform, as the vapor is not concentrated; the patient is able to breathe during the first stage without a feeling of irritation or suffocation, which may lead to choking or vomiting; in reality, quicker time is made in getting a patient to the third or surgical stage than when the anesthetic is crowded. The second stage of excitement is absent except, perhaps, in very muscular and alcoholic subjects; it does away with the asphyxial element of ether; the administrator has his patient under better control, *i.e.*, he is better able to know his subjects' narcotic susceptibility. There is a uniform anesthesia; there is no appreciable fluctuation in the percentage of vapor inhaled; but a gradual, scientific anesthetic state brought about which permits of a deeper and more satisfactory narcosis with a small amount of drug being used."

PERCENTAGE LIMITATION OF VAPOR CONCENTRATION

An overdose of anesthetic is a concentrated dose. Anesthetics, volatile, hypervolatile, or gaseous in nature, cause many disagreeable and dangerous conditions when given in undue concentration. We may cite only a few instances, viz.: Chloroform will cause death almost at once from its toxic and depressant action on the medulla and heart. Ether will cause spasm and obstruction of the upper air passages with consequent cyanosis and may thus lead to death.

Ethyl chlorid (including somnoform) will produce a spasmodic condition of the respiratory muscles, and also clonic and tonic spasms of various muscles of the entire body with unsatisfactory anesthesia.

Nitrous-oxid in undue concentration will soon produce jactitation.

Safe and satisfactory anesthesia obtains when the inhalation process is uniform and the correct percentage of vapor or gas for a given patient is used. A drop-ether open method may contain a vapor percentage within the dome of the mask anywhere from no per cent. up to the point of saturation. The amount of concentration (in other words, dosage, or percentage) of various anesthetics for man is fairly well established—ether, for example, being about 15 per cent. by weight when the patient is surgically anesthetized.

MAINTENANCE OF A PATENT AIRWAY TO PREVENT EMBARRASSMENT OF RESPIRATION OR CIRCULATION.

A normal individual has a certain relative tempo of both the respiration and heart beat. On an average there are four pulse beats with every respiration, 4.72. Any interference with free respiration will produce abnormal changes in the heart and circulation. Respiratory pressure has a marked influence on the dilatation and contraction of the heart.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, June 21, 1916, at San Francisco.

Cardiac dilatation during disatole is partly produced by the elastic traction of the lungs during inspiration—the greater the inspiration, the greater the expansion of the heart. The opposite occurs in expiration, there being compression with but little blood entering the heart. If the glottis or upper air passages are obstructed during anesthesia, the heart action suffers directly in proportion to the obstruction, and the systemic and pulmonary circulations are in turn affected. The toxic action of an anesthetic will produce serious trouble if the distribution and elimination of the drug is not carried on properly.

In sluggish or arrested circulation, the anesthetic exerts its toxic influence on the heart, that is, the endocardium, coronary circulation, and ganglia, and also on the sinus of the venae cavae (Remark's ganglia), and medulla. When the thorax is not under any strain, and is in a position of moderate rest and normal elastic traction (7.5 m.m. Hg.), the conditions for the action are most favorable. Not only do the lungs, but also the heart and circulation, feel the effects of pressure changes produced by respiratory obstructions.

The thing to do, therefore, during anesthetization is very simple—maintain the very best unobstructed airway possible.

DIFFERENTIATION OF PUPIL REFLEXES

The following table gives the differential diagnosis between physiological reflex dilatation and pathological paralytic dilatation of the pupils during anesthesia:

REFLEX DILATATION.	PARALYTIC DILATATION.
Pupil is bright, mobile, liquid, life-like hue.	Pupil is dull, sluggish, immobile, death-like condition.
Other reflexes usually present.	No reflexes of any sort present.
Patient shows signs of "coming out."	Entire body relaxed.
Marginal motility of the iris is present.	No marginal motility is present.
Eye-balls may roll.	Eye-balls are fixed.
Reaction of pupil to light.	No reaction of pupil to light.
Not enough anesthetic has been given, determined by clinical experience.	Too much anesthetic has been given, or not enough, resulting in reflex, cardiac inhibition.
Respiration and circulation in fair condition.	Respiration and circulation failing.
Skin has good color.	Skin is cold and clammy; pallor or lividity.
Eyelids usually closed.	Eyelids remain partly open, due to relaxation.
Tonicity of eyelids is present.	No tonicity of eyelids.
Tears are not markedly secreted.	Increased secretion of tears.
More anesthetic will contract the pupil (third stage).	More anesthetic will produce still wider dilatation, plus respiratory and cardiac arrest.
Less anesthetic will cause pupil to remain large (reflex dilatation).	Less anesthetic, or none, will cause the pupil to contract back to third stage.

ROUTINE METHODS OF RESUSCITATION IN EMERGENCIES.

1. Remove the mask.
2. Get the tongue forward.
3. Lower the head.
4. Artificial respiration.
5. Dilate the sphincter.
6. Drugs.

These are practically self-explanatory, but one or two points should be emphasized.

The mask is removed to prevent more vapor from being inhaled during artificial respiration. Strange as it may appear, I have seen internes producing Sylvesterism with a saturated mask left on the patient's face!

The tongue is brought forward to obtain a free airway.

The head is lowered to send blood to the vital centers in the brain; except perhaps in cases of deep cyanosis.

Artificial respiration is given to produce aeration of the blood, to keep or set in motion the heart by indirect stimulation, and to eliminate the anesthetic from the system.

Dilating the sphincter produces the well-known ano-respiratory reflex, but should not be relied on wholly, because in a certain percentage of cases there is no reflex set up by the method. It often sets the respiratory pump in action, and should always be used in conjunction with other means of resuscitation.

Drugs are purposely placed last on the list, because their action is not rapid enough to give quick results by themselves. When a patient has entered the fourth stage of anesthesia, mechanical measures of resuscitation should always be used first, and later whatever drugs seems desirable can be selected and given.

228 METROPOLITAN BLDG.

TO THE READERS OF THE SUPPLEMENT.

¶ Forthcoming issues of the Supplement will contain the papers read during the Special Section of Anesthesia of the Joint Session of the National Dental Association and the Interstate Association of Anesthetists. This will be one of the most authoritative symposiums on Anesthesia for Oral Surgery ever published.——*Editor.*

FACTORS OTHER THAN THE ANESTHETIC CAUSING DANGER IN ANESTHESIA.*

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I purpose in this short paper to emphasize the importance of the personal equation, both of the operator and of the anesthetist, for the successful outcome of a surgical procedure.

The first important quality in the anesthetist is a sane confidence in himself. He should not be overconfident, rash or presumptuous. Such a one is either ignorant from inexperience, or constitutionally unfit to undertake so dangerous a specialty. On the other hand, he should not be so timid as to fail in obtaining an anesthesia or in securing its even continuation. Experience may convert the timid man into a conservative yet efficient one, but no number of cases can render the unthinking and rash person a safe anesthetist. The anesthetist should feel that he is the pilot to whom has been intrusted the ship of life while it is sailing a dangerous shore. Hence eternal vigilance is the price of a safe voyage.

He must choose the form of anesthesia, the kinds of anesthetic to be used, and the depth of anesthesia to be maintained. He, therefore, should know the surgical procedure intended or undertaken, so that he may employ the proper prophylaxsis, issue the required warnings, and govern his management accordingly. It is essential then that the surgeon have faith in the ability and good judgment of the anesthetist, so that he may calmly and confidently perform his work, knowing there will neither be unwise interference or dangerous acquiescence. The surgeon and the anesthetist must be in thorough accord. During the operation the anesthetist must be equal to the surgeon, and in anesthetic emergencies commander-in-chief. The anesthetist must not be afraid of the operator. He should, I believe, be a physician, be well informed, of sufficient experience to justify a sane and well-grounded confidence in himself, thoroughly familiar with the technic of handling emergencies, and of sufficient personality to dominate the situation.

It is exceedingly important that the patient should put implicit trust as far as possible in the skill and ability of the anesthetist. The anesthetist then must by no means be deficient in the power of inspiring confidence. He stands more in need of tact than any other specialist. He should know almost intuitively how to approach the individual patient. Each occasion will usually put in the anesthetist's mind the appropriate suggestion. Proper encouragement, gentleness, and persistent firmness must be judicially mixed with the administration in order to produce a safe and sane anesthesia.

Having had, by hospital or other training, sufficient experience to inspire confidence in himself, in the operator, and in the patient, and being endowed by nature with a fair amount of tact, the safe and successful practitioner of this art must have the power of keen observation and prolonged concentration. He must not only be able to see the phenomena taking place, but capable of giving the proper interpretation thereto. This power of making a quick and correct decision is a very essential quality of the anesthetist. He should know instantly how to apply the indicated remedy at the correct time in the proper manner.

Above nearly everything else the anesthetist must have the faculty of prolonged concentration on one subject, so as to never be so wearied by monotony as not to know just what is going on all the time, hence his attention should never be distracted. The lack of intelligent continuous watchfulness is the chief cause of both failure and fatality.

A very necessary characteristic for the anesthetist is coolness under alarming conditions. However grave the emergency, he should never get *rattled.*

The ideal anesthetist should be well informed, confident, tactful, observing, judicial, quick to act, watchful and cool. I believe also he or she should have a full medical training. Such a person who has developed an aptness for this dangerous and absolutely essential work should be treated by the surgeon, the profession, and the laity in an appropriate and dignified manner. Professional honors and adequate financial recompense should be his reward.

Years ago the phrase *"only an anesthetist"* was a disparaging term. We older men had to face these unfair conditions. Later a more becoming dignity has been awarded the anesthetist.

If, however, the profession wish to have trained men and women devote their time to this specialty they must see to it that a sure and commensurate financial reward be given these devotees. The anesthetist during an operation suffers more from strain and weariness than the operator. The surgeon has variety, the anesthetist monotony. I have been much more wearied by giving a prolonged anesthetic than in performing a double mastoid operation.

Hitherto *"giving an anesthetic"* and *"teaching school"* have been stepping stones to higher professional attainments. Both of these specialties are worthy of permanency, honor, and financial reward. If the people desire competent educators and reliable anesthetists they must pay them. There should be no lowering of either standard or reward.

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* Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, Cal., June 21, 1915.

Before dismissing this part of my subject, I will, like Silas Wegg, drop into poetry and say to the anesthetist:

Close watch the flowing crimson tide,
With touch upon the pulse applied
  To know its meaning well.
If it go fast, if it go slow
Its number, rythm, tension know,
  For they the life gauge tell.

The hues that mantle on the cheek
Conditions of the blood bespeak,
  Observe with anxious care.
Then ever keep the mind at work,
Nor let it tire nor let it shirk,
  Nor wander otherwhere.

Note well sleep's elder brother,—Death
Awaits the shallow faltering breath.
  Beware the open pupil, still;
Beware the muscles that are lax,
The jaw that lags or tumbles back,
  Such symptoms bode but ill.

That man is blind as he can be
Who seeing all there is to see,
  Observing does not understand.
Then keep the mind alert and keen,
Quickly decide on what is seen,
  All things hold firm in hand.

Be not o'er timid nor o'er bold,
As coward or as dolt enrolled,
  Maintain an even sleep.
The surgeon then will give you praise,
The patient too will bless your days,
  And you your job will keep!

If things go wrong, be calm and cool,
Be rattled not, nor play the fool,
  Work on a well-laid plan.
And in the end have sand and sense
To ask a proper recompense,
  Be reckoned as a man!

The other personal factor that may be dangerous to the patient is the operator himself. Anything that the surgeon does that needlessly shocks the patient, or prolongs the operation without just cause, should be avoided. The true surgeon is fully aware of the fact and is, I am pleased to say, as time goes on, more and more in evidence. There are, however, several varieties of undesirable surgeons, some of whom I will briefly mention.

Under this head I will speak first of the presumptuous surgeon. He who assays to do an unnecessary operation, or he who attempts to do too much at one time, one operation after another just because the patient is under an anesthetic. Many a patient is severely shocked, and some may undoubtedly lose their lives on account of this culpable practice.

Closely allied to this man is the too timid operator, or the very slow and tedious worker who putters around wasting valuable time, and contributing to the dangerous condition of the patient.

Quite like these two is the unprepared operator who must always wait for the sterilization of forgotten instruments. The surgeon who stops and consults over every little detail, and the man who desires to make a grand-stand play by lecturing to visiting physicians and spectators, may, under some circustances, be very detrimental to the patient's welfare. The meddlesome physician who insists on the employment of the improper vapor or drug (especially the old-fashioned champion of chloroform), may become a grave complication in anesthesia. The ignorant man who has no business to operate at all is not often met with; he, of course, is the most fatal in his faults, but his manifest incompetency curtails his field of action

By far the most common variety of the undesirables, and hence the most dangerous of them all, is the rough surgeon. Unfortunately, this operator is utterly unconscious of his fault. Unseemly haste, the desire to make a grand-stand play, fear of the anesthetic, the consideration of mechanical results as of prime importance, his forgetting the delicate nature of the structures involved, and sometimes a natural uncouthness of manner, are some of the contributory causes which make a surgeon rough.

The reflex irritation due to his severe manipulations not only shocks the patient, but by interfering with anesthesia, often gives the administrator a wrong impression as to the depth, thus inducing an overdose of the drug.

Another place where the operator and the anesthetist should be in accord is the preanesthetic handling of the patient. They both should agree as to the preparatory and adjuvant medication. This is especially true in reference to the administration of nitrous-oxid and oxygen in prolonged abdominal operations.

I will close this paper with a few remarks in rhyme:

The doctor that's snappy,
The doctor that's scrappy,
  The doctor that scolds every day,
Whose mouth's full of curses,
Who rattles his nurses,
  Makes many a deadly delay

The professional hawker,
The slick and glib talker,
  Whose restless tongue nothing can balk,
Commits many a crime,
Wasting valuable time,
  With a patient in surgical shock

The man who insists,
That the anesthetist
  Should give the wrong vapor or drug,
Had far better quit,
If he hasn't the wit,
  For safety to muzzle his mug.

The very worst saying—
More people betraying,
  Than anything under the sun,
Is, "just give a whiff
Of chloroform" if
  There's nothing much to be done!

The unprepared man
With no well-laid plan,
  Who new tools must e'er sterilize,
Who loiters and waits,
Who stops and debates,
  Has a job too big for his size.

That too timid cutter
Who does nothing but putter,
  Accomplishes naught, I am sure,
But it is pathetic
How much anesthetic
  The poor patient has to endure!

Let Sir. Surgeon Fixit
Be shown to the exit,
  Who does operating galore,
Who does one thing then tother
Right after the other
  And cries when there isn't some more.

The surgeon that's gruff,
The surgeon that's rough,
  The surgeon that pummels and mauls
The shrinking intestines
Is as bad as ten pests in-
  Side the abdominal wall!

And the doctor that's sore
Who hollers "give more,"
  Whenever the patient may flinch,
May himself be at fault
By his heavy assault
  That causes his patient to wince!

When wearied and harried
By thrusts no more parried
  The patient succumbs and is dead,
The surgeon will wonder
And blame all his blunder
  Upon the anesthetist's head.

SPINAL ANESTHESIA.*

JOHN OVERTON, M.D.,
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In attempting to discuss the subject of spinal anesthesia or as some prefer to call it, spinal analgesia, I expect to do so as nearly as possible from an unprejudiced standpoint, giving it credit for what it is worth and emphasizing its danger. When we go over the various methods of anesthesia we must realize that so far there is no one that is satisfactory and safe for all classes of cases. Dr. Keen of Philadelphia has said that "The ideal anesthetic must be one that will abolish pain by the abolishment of consciousness but without danger to life." Many others of less prominence no doubt have expressed the same opinion, and we all must agree that this is the desired solution.

Spinal anesthesia has been taken up and used in the clinics of many skilled and careful surgeons; some who began its use with enthusiasm have given it up almost entirely; others have continued to use it with great success and increasing satisfaction, progressively extending its application. Probably there has been error in judgment on both sides, but I do not feel that it should be subjected to such extreme criticism as to make its use a just cause for malpractice, or to class it as a surgical *stunt.*

HISTORICAL CONSIDERATIONS.

In 1885 Corning, of New York, first used cocain in proximity to the dura about the spinal cord. Later he used subdural injections for relief of irritable conditions of the cord. In 1898 Bier, of Berlin, first used it in the production of anesthesia for surgical reasons. He was very careful in his work and warned against its too general adoption. Unfortunately, as so often occurs with new surgical methods, there was a careless and poorly considered application of this procedure. As a result there were a number of fatalities and permanent unpleasant sequelæ.

It was then generally given up. However, a few continued its use carefully considering its indications and guarding against its dangers. Among such may be mentioned Bier of Berlin, Tuffier of France, Barker of England, Morton, Babcock, Bainbridge and Allen of this country.

Cocain was the drug first used, but on account of its toxicity it has been displaced by safer preparations, notably stovain, tropacocain and novocain. Injection below the lower end of the cord has been the most common and widely used method. Recently injections above this point have been used by Babcock. He thinks it best to inject as near as possible to the nerves distributed to the field of operation. Jonnesco, of Budapest, used stovain in combination with strychnin and injected at any point in spinal canal. He had a large number of cases with very favorable results, however, few have been willing to follow him.

INDICATIONS AND CONTRAINDICATIONS.

A safe rule, especially for those beginning this work, is to select only those cases in which a general anesthetic is positively contraindicated, local or regional anesthetic inadequate and operation one of necessity and not of choice. There is a wide difference of opinion according to the literature in just what conditions it is indicated and in what contraindicated. Some advise its use in severe cardiac, pulmonary and renal disease; in the old, in the weak exhausted cases and in those cases where we anticipate a long severe operation. It is adapted to prostatectomy in old men, in operations on the external genitals, rectum, and lower extremities, in diabetes, and in cases of acute peritoneal sepsis and paralytic ileus. I believe it also suitable for examination of tubercular bladder, and in some cases of intestinal obstruction. It is contraindicated in cases of myocardial disease, especially associated with obesity; in advanced arterio-sclerosis where we have reason to believe that the cerebral vessels are particularly affected; in cases of acute hemorrhage and shock with lowered blood pressure. Most believe it should not be used in very young, nor where we have cerebrospinal disease or some anomaly of the spine. Of course it should never be used where there is any infection close to the point of puncture. Where pyemia exists it is also thought to be contraindicated.

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* Read during the Organization Meeting of the Interstate Association of Anesthetists, at Cincinnati, O., May 4-5, 1915.

One case of tubercular meningitis being reported, which developed following its use in a case of tuberculous knee. It should never be used with those who have any aversion for it. Let it be understood that all do not accede to the foregoing indications and contraindications.

Babcock claims it should never be used in cases that cannot stand a reduction in blood pressure, or those in which artificial respiration cannot be instituted for their relief, if indicated. The same author after studying his statistics and those of others, obtained through personal communication, has not found much difference in the mortality of ether and of spinal anesthesia. He also claims that with proper technic and pure drug there are fewer morbid results following the use of spinal anesthesia. It has a number of disadvantages, among which are, that it is not applicable to all cases; that it fails in a small percentage of cases; that the dose cannot be diminished after once being given; that only those who have specially prepared themselves and have developed a perfect technic should use it.

DANGERS AND COMPLICATIONS.

We must realize the possibility of death from respiratory paralysis, as well as temporary and permanent disabilities from paralysis of various groups of muscles. Symptoms of collapse may arise during anesthesia such as air hunger, faintness, disturbed vision, weak, rapid pulse, free perspiration, nausea and vomiting. It may be followed by symptoms of meningism, sleeplessness and various paresthesias, backache, acute decubitus and gangrene, transient nephritis, chronic neurasthenic state, and prolonged stubborn headache. Few cases have elevation of temperature, which is thought by some to be due to irritation of the heat center. There may be a complete relaxation of the sphincter or there may be retention of urine.

The treatment of collapse is to raise the head and shoulders, give stimulation by strychnin, caffein, oxygen, saline transfusion and pressure on abdomen. If symptoms of respiratory paralysis develop we should institute artificial respiration and keep it up until after the heart has stopped. Of course the best treatment would be to closely observe the height to which anesthesia reaches; and to raise the head and shoulders, should it go as high as the clavicle or involve the arms. To prevent the sequelae we should use preparations that are fresh and prepared according to strict instructions. By these means we will avoid much inconvenience and anxiety to ourselves and best guard the safety and permanent health of our patients. This applies if the solution is not lighter than spinal fluid, if lighter the patients' head is lowered, artificial respiration and stimulants carried on.

AGENTS FOR SPINAL ANESTHESIA.

At present stovain, tropacocain and novocain are the drugs used. From evidence obtainable through reading it appears that tropacocain is the safest. Stovain, however, has been used in a very large series of cases by Babcock of this country and Barker of England. These drugs may be used alone or in combination with suprarenal preparations. There is a disagreement, however, in reference to this point. Some think that suprarenalin better localizes the effect of the anesthetic as well as enhances it. Others believe that it is unsafe to use it, because of the unstable nature of the suprarenal preparations and the consequent danger of injury to the nerves with resultant paralysis or trophic disturbance with decubitus. All the drugs are susceptible to sterilization by heating. This should, however, not be too prolonged. Stovain has in itself positive antiseptic properties. They are all used in five per cent. solutions, the dose being from five to seven one hundredths of a gram. Some use a solution lighter than the spinal fluid, some of the same specific gravity and some heavier. Some inject immediately following puncture, others prefer to allow the escape of five to ten c. c. of spinal fluid and then inject; others dilute the solution with the spinal fluid and return it all to the canal. It is claimed by Babcock that the anesthetic affects the nerve roots and not the spinal cord. It takes place by a chemical affinity between the nerve substance and the anesthetic drug.

METHOD OF ADMINISTRATION.

The majority put the patient in a sitting position with legs hanging over the table and back well flexed.

and since the cord ends at a level with the second lumbar vertebra, make the puncture between the second and third or the third and fourth, the latter being the safer, since the cord may possibly be lower than normal. The puncture may be made either directly in the median line or a little to the side, the needle in each case pointing slightly upward and toward the median line. It is well to use only a gold or platinum needle of the Quincke style and to withdraw the stilette before entering the subarachnoid sack, and do not attach the syringe until the fluid flows out freely. These precautions are taken, first, with the idea of puncturing the sack directly in the median line, so as not to get into either group of nerve fibers, nor to penetrate too far forward where the motor roots lie and might therefore be more affected; and lastly, to be sure the needle is well within the sack so that the solution would not be injected extradurally. The patient is allowed to remain sitting for three minutes if solution is not lighter, then is slowly put in a recumbent position with head and shoulders slightly elevated. It is generally considered unwise to elevate the pelvis too quickly. However, after fifteen minutes the Trendelenburg position may be used. Dr. Babcock in using his light solution immediately after injection lays his patient down with the table so tilted that the shoulders are two inches below level of hips. This is to prevent the upper diffusion of the drug with its consequent dangers. Barker uses a technic different from most of the others. He claims that by using a solution distinctly heavier than the spinal fluid we can definitely control the height of the anesthesia by changing the elevation of the shoulders and pelvis with the patient lying in the lateral position. He takes care that this level is not disturbed in changing into the recumbent position. He uses stovain with the addition of a little glucose, which has a specific gravity of 1.02, the spinal fluid varying from 1.003 to 1.007. It is also possible by this procedure to anesthetize only one limb. As a rule, a properly performed lumbar anesthesia is sufficient in the class of cases indicated. If not complete, it may be repeated, unless the full dose has already been given, or we may proceed with the assistance of a small amount of ether, one to two drams will frequently be enough for a long operation. Others like to use the morphin-scopolamin combination or local anesthesia in addition. All instruments should be kept only for this purpose and sterilized either with steam or boiled in distilled water, as an addition of alkalis or strong antiseptics may neutralize the effect of the anesthetic or produce irritation within the canal. We may prepare the solution fresh or use already standardized ampoules or tablets of definite amounts. The technic we have used is as follows, and is practically that of Gellhorn of St. Louis:

The patient is given the same general and local preparation as for any operation, but may be allowed to take food within a short time of going to the operating room. He is put on the table in a sitting position with legs hanging over and puncture is made between the third and fourth lumbar vertebrae. As soon as the fluid flows freely, the syringe, already filled, is attached and as much spinal fluid drawn in as we had of solution. We generally use 3 c.c. of a 5 per cent. novocain solution, but I believe we may safely use it in as strong as a 10 per cent. solution. After remaining in the upright position for three minutes the patient is gradually lowered to the recumbent posture with head and shoulders slightly elevated. In ten minutes preparation may be carried out and in fifteen the operation may be begun. The anesthesia usually lasts from one to two hours. After return to room patient should be kept recumbent and watched closely for the first few hours. This is the method we have used in a small series of cases with satisfactory results and no bad effects. Hereafter when I use this method of anesthesia I intend to use the solutions and follow the technic of Dr. Babcock.

In conclusion, let me say to those who may at some time contemplate using spinal anesthesia that unless it is a case of great emergency and nothing else will do, to study the subject carefully, familiarize themselves with every detail of technic and be as sure as it is possible to be of the purity of the drug employed. For those who have employed it widely I have no word of advice.

TO THE READERS OF THE SUPPLEMENT

THE AMERICAN YEAR BOOK *of*
ANESTHESIA *and* ANALGESIA.

¶ While the Anesthesia Supplement covers the Transactions of the various associations of anesthetists, the American Year Book of Anesthesia and Analgesia will enable the surgeon, specialist, dentist, anesthetist and research worker to review all the current advances in the science and practice of these subjects, as they interest him individually.

¶ Among the contributors are: R. S. Lillie, Theodore Casto, F. C. Mann, W. D. Gatch, G. W. Crile, E. I. McKesson, Y. Henderson, A. H. Miller, A. G. Levy, R. H. Ferguson, W. P. Burdick, J. Jarvis, J. J. Hogan, J. T. Gwathmey, A. H. Warner, R. A. Rice, A. E. Guedel, J. O. Polak, F. H. McMechan, E. S. Barber, W. H. DeFord, R. H. Riethmüller, Kurt Thoma, C. W. Allen, L. . Hirschman, C. T. Souther, W. Harris, A. E. Hertzler, W. T. Porter and G. G. Smith.—*Editor.*

THE SELECTION OF THE ANESTHETIC.*

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Introduction. New methods and many refinements in anesthesia have been brought forward within the last decade. At the present time many men in the larger cities are devoting all of their time or practically all of it to the study and administration of anesthetics as has been done in England for many years. Such work is a specialty in itself and worthy the devotion of a life time. The day has passed when a bystander, an untrained assistant or a nurse with only a mask, chloroform ether, and a tongue forceps is called upon to render unconscious, I should hardly say to anesthetize, the patient. In almost every town and even in the country there is at least one physician who has made a special study of anesthesia and who should be called for such work.

An anesthetist must be competent enough to skillfully administer any one of the well-known agents or to use any one of the reliable methods. A man who exclusively uses one drug or method is manifestly incompetent. I am convinced that even the safer agents, if given by improper methods or to unsuitable subjects, will as surely cause trouble as the most dangerous agent. A cursory analysis of anesthetic fatalities will convince one that quite often the method and not the drug must be blamed.

SELECTION OF AGENT AND METHOD.

The most important duty of the anesthetist is the selection of the agent and of the method. The following points should be considered:

(1) Dangers of the agent to be used.

(2) Applicability of the agent and method for the particular operation to be performed. The surgeon should have a free field for his work so that he may do that work with ease.

(3) The patient should be considered both from a pathological and from a psychological viewpoint. In some clinics little if any attempt is made to select the agent. Each patient receives the same treatment regardless of any indication to the contrary. This is especially true in those clinics where nurses are the anesthetists.

We have at our disposal the following methods of anesthesia: (a) local; (b) automatic inhalation; (c) intratracheal insufflation; (d) rectal; (e) spinal; (f) intravenous; (g) electric. For local anesthesia cocain or novocain combined with epinephrin is usually employed. In inhalation methods nitrous oxid, ether, ethyl chlorid and chloroform are the drugs ordinarily used. Intratracheal insufflation anesthesia may be maintained by nitrous oxid though ether is the more ordinary agent. In rectal anesthesia ether alone, though dangerous, was formerly employed but lately Gwathmey has introduced a mixture of olive oil and ether with which good results have been obtained. For spinal analgesia either novocain or stovain is now used in place of cocain which was formerly employed. For intravenous work a five per cent solution of ether in normal saline either alone or combined with hedonal (ten grains to the pint) may be employed. Solutions of paraldehyde and of isopral have also been found useful for intravenous work.

As to the degree of favor in which these methods are held, either local or inhalation anesthesia or a combination of the two is favored by the majority of men. Rectal, spinal and intravenous anesthesia each has its advocates, though these methods have not as yet received the stamp of general approval. Electric anesthesia has been found successful with the laboratory animal and also in several instances upon the human subject for local analgesia but its possibilities are as yet unknown.

Of these methods the safest is local analgesia and second to it is inhalation anesthesia. A combination of local with inhalation anesthesia as in the method of Crile would naturally occupy a place of intermediate safety.

PRELIMINARY MEDICATION.

In general it is best to administer a preliminary hypodermic of morphin and atropin or of morphin and scopolamin. In the case of an adult patient the dose should be from 1/6 to 1/16 grain of morphin and from 1/100 to 1/200 grain of atropin. When scopolamin is used the dose should be 1/200 grain or less. With children and the aged it is my rule to administer a small dose of atropin and no morphin.

DETERMINING FACTORS.

In determining what agent to use the question of safety should be the first one to consider. The comparative safety of the various agents in ordinary cases and their safety in special conditions must be considered. Not only should the drug selected entail the least immediate danger but it should also cause the fewest delayed results. It is not enough to carry our patients safely through the period of induction and through the operation but we must always consider the possible after-effects. Authorities are agreed that postanesthetic acetonuria and glycosuria follows the exhibition of ether in a small percentage of cases, with chloroform in a large number of cases but never with nitrous oxid. The mortality for a given agent may be less than for another agent and yet for certain cases the apparently safer drug would be the more dangerous one.

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*Read during the Organization Meeting of the Interstate Association of Anesthetists, Cincinnati, O., May 4-5, 1915.

The agent should be selected which will be best tolerated by the patient. The preoperative as well as the postoperative comfort of the patient must be taken into consideration.

LOCAL ANESTHESIA.

Local anesthesia is at present just coming into its own. It is undoubtedly true that the surgeon can perform his work with greater ease and rapidity when the patient is under a general anesthetic but there are many cases in which local analgesia should be used even though the surgeon must go more slowly and carefully. Without doubt general narcosis produces more or less shock, it matters not how trivial the operation may be. But it is also true that with very nervous individuals, when a local anesthetic is used, the sight of the operation may even produce more shock than a general anesthetic would. In fact death has resulted from the use of local analgesia in very nervous and weakened individuals. It therefore follows that cases for local anesthesia should be just as carefully selected as for any other method. The greatest field for usefulness for local anesthesia is in small operations though operations of any magnitude may be performed by proper attention to details. This method is of particular value in the country or in private homes when no trained assistants are at hand. In resection of a rib in empyema when the patient is very weak and septic and when the respiration and heart action are rendered difficult, the use of a local anesthetic is imperative. It is also best in patients suffering with diabetes mellitus; pneumonia; advanced phthisis; advanced renal disease; heart disease, after failure of compensation; and in all dyspnœic conditions.

NITROUS OXID.

Without the slightest doubt nitrous oxid with oxygen is the safest known inhalation anesthetic provided that it be properly administered. Nitrous oxid should never be given except by a careful and experienced person and its safety depends greatly upon whether or not it is so given. In reality nitrous oxid is a dangerous agent if employed by an inexperienced person because its zone of anesthesia is so narrow. As a routine agent, nitrous oxid with oxygen is being used by an ever increasing number of men and it deserves to be so used. But it is certainly true that there are certain conditions in which nitrous oxid is absolutely contraindicated. If administered in the face of certain contraindications it really becomes a dangerous drug and I feel that its mortality rate, slight though it is, is largely due to improper selection of the cases.

For operations of brief duration nitrous oxid is exceedingly valuable but it should never be used even for a minute unless oxygen is at hand for administration should untoward symptoms arise. As a preliminary agent to ether it is exceedingly valuable. Nitrous oxid-oxygen may be used for the majority of cases and particularly should it be used in the following conditions: diabetes mellitus, renal disease and phthisis where it is impossible to use local anesthesia. It is a very valuable agent in weak, anemic and cachectic patients as also in very nervous individuals.

In a nitrous oxid-oxygen case, if it is necessary to keep the patient cyanotic to maintain anesthesia, this agent is unsuitable. In such a case the percentage of oxygen should be increased and ether added or a change to ether alone should be made.

Mechanical obstructions of the respiratory passages are contraindications to nitrous oxid. Plethoric or fatty patients are also not very suitable subjects because of the fact that their lung capacity is small in proportion to their body weight. Athletes, heavy smokers and alcoholics are also unsuitable subjects. In children nitrous oxid does not answer so well as ether. In patients over sixty years of age in whom atheromatous conditions are usually present, nitrous oxid would entail considerable risk of cerebral hemorrhage. Those with valvular defects, dilated hearts or myocardial change should preferably not receive nitrous oxid. Thyroid cases may receive it but if the gland is large with tracheal pressure it should not be used as ether by the semi-open method is better.

ETHER.

Only second in safety to and more available than nitrous oxid ether is the best drug for general use. Of the various methods for its use, the closed, formerly so frequently employed, has been largely superseded by the various open methods. Administered by the open or semi-open method it is a very satisfactory and safe agent for the average patient. Ether given by either of these methods has the following advantages: (1) simplicity; (2) safety; (3) economy; (4) utility. A preliminary hypodermic of atropin or of atropin and morphin assists materially when ether is to be used.

Where possible the most agreeable method for ether is to use nitrous oxid-oxygen as a preliminary agent. This sequence is very valuable with nervous and excitable patients. The period of induction is shortened, the period of visible excitement is usually absent and the amount of ether used is lessened. With this sequence I believe the preferable technic is to first anesthetize with nitrous oxid-oxygen and then gradually to add the ether vapor to this mixture until the patient is thoroughly anesthetized. Then the gas is discontinued and the open, semi-open or vapor method substituted. It must be remembered that the contraindications to prolonged nitrous oxid-oxygen anesthesia also hold good for its preliminary use before ether.

When nitrous oxid is contraindicated ether may be given from the start. It may be claimed that it is very unpleasant when so given but this is true only when improperly administered. By very gradually increasing the concentration little, if any, unpleasantness is noticed. There should not be a stage of excitement except in a very small percentage of the cases, mostly in alcoholics. If the anesthesia has been an even one there is rarely any troublesome nausea or vomiting with this method. Following Gwathmey's suggestion I have used oil of orange as a preliminary to ether. It aids materially by masking the odor of the ether. I have however not noticed that the amount of anesthetic has been thereby lessened as some observers have claimed.

Ether may be used by some one of the various methods in the majority of cases. In valvular defects, in thyroid conditions, in mouth cases and in athletes I have found it of especial value. In pulmonary conditions ether may be given but nitrous oxid or local anesthesia is preferable. It was formerly advised that ether should not be given in chronic bronchitis but if a sufficient dose of atropin is previously given no trouble will be experienced. Preferably in cases presenting a permanent high blood-pressure ether should not be given though in a few cases when it has been impossible to use any other agent I have given it without any trouble. The special indications for the use of local anesthesia mentioned in a preceding paragraph would contraindicate the use of ether. It must not be given when the actual cautery is to be used about the face.

CHLOROFORM.

For many years chloroform was given the preference over ether by the majority of men. Many investigations have been conducted to ascertain the comparative safety of these two agents. From a large number of statistics it appears that ether is not less than six or seven times safer than chloroform when the immediate mortality is considered. Chloroform is dangerous no matter by whom it is given. No one should attempt to administer it unless he has had considerable experience in anesthesia. It has certain advantages but these advantages do not, as a rule, compensate for its greater danger.

It was formerly stated that: "patients were lost with chloroform on the operating table and with ether, afterwards." But it has been proven that delayed chloroform poisoning is not at all rare. Even in dilute dosage it undoubtedly causes more or less fatty degeneration of the liver and kidneys which may lead to a fatal effect days after the operation. This is particularly likely to occur in septic cases because in these the liver and kidneys have already been overworked. Acidosis in children, and acetonuria and glycosuria in adults frequently follow the administration of chloroform. Particularly in obstetrical cases where also the liver and kidneys are already overworked, I think that chloroform should not be used.

The immediate danger from chloroform is usually circulatory in character. For this reason when it is given a phonendoscope should always be strapped over the precordia for the purpose of continuous auscultation. I have records of several cases in which the phonendoscope rendered very valuable assistance in indicating approaching danger from chloroform. Children are not safer subjects for chloroform though in case of accident they are more likely to respond to prompt measures than adults. Apparently men are more susceptible to its action than women though they may be only apparently so from the fact that a relatively larger dosage is necessary to anesthetize.

Except in the following cases chloroform should not be selected: (a) operations which require the use of the actual cautery about the face; (b) in patients presenting a permanent high blood-pressure; (c) in aneurysm; (d) patients in the Trendelenburg position take it well and if necessary for the purpose of securing relaxation it may be used in sequence to ether or to nitrous oxid-oxygen-ether; (e) obstructed air passages; (f) in all other cases *only* when it is absolutely impossible to use local or obtain nitrous oxid or ether anesthesia.

CONCLUSIONS.

In conclusion I desire to emphasize the following points:

(1) The anesthetic must be selected for each individual case.

(2) The field for local anesthesia is widening

and it is very valuable in minor surgery and for the markedly handicapped patient.

(3) Nitrous oxid-oxygen alone or combined with local anesthesia is the safest general anesthetic and should be used whenever possible.

(4) Ether must still remain the anesthetic of choice for the majority of physicians.

(5) Chloroform is dangerous and should be used only when positive indications are present for such use.

(6) Rectal, intravenous and spinal methods are still on trial.

1036 Bardstown Road.

NITROUS OXID-OXYGEN ANESTHESIA: WITH DESCRIPTION OF A NEW APPARATUS.*

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In 1772, Dr. Priestly prepared a gas which he called dephlogisticated nitrous air. Sir Humphrey Davy, in April, 1799, in the course of a series of hazardous experiments upon himself, inspired this gas in a state of purity and was rendered unconscious for about ten minutes. He named the gas nitrous-oxid and predicted its use to relieve the pain of surgical operations. In November, 1844, Horace Wells, a dentist of Hartford, Conn., imbued with the theory that operations might be performed without pain, procured some nitrous-oxid, himself inhaled the gas, and was rendered unconscious for a dental operation, administered it to a number of his patients, and immediately set out to make his discovery known to the world. To Horace Wells first came the conception of what we know as surgical anesthesia. While his public demonstration was such a failure that the disappointment resulted in his death, the inscription on his monument in Hartford is well deserved: "Horace Wells, the Discoverer of Anesthesia, December, 1844."

COMPOSITION AND PREPARATION OF NITROUS-OXID.

Nitrous-oxid gas consists of two parts of nitrogen with one part oxygen, in stable chemical combination. The atmosphere contains four parts of nitrogen to one of oxygen. In the atmosphere, the elements are not chemically combined, but form a loose mixture from which the blood readily absorbs one-fifth of the oxygen for the use of the body. While the proportion of oxygen in nitrous-oxid gas is twice as great as in the atmosphere, the combination between the two elements is so stable that the blood can obtain no oxygen from the gas.

To obtain nitrous-oxid, ammonium nitrate is heated in a retort until it decomposes into water and nitrous-oxid. The gas is purified by being passed through a solution of ferrous sulphate which absorbs any nitric oxid which may have been formed and afterward through a solution of sodium hydrate to remove any chlorin which may have been derived from the ammonium chlorid in the nitrate used. The gas is then collected in a gasometer over warm water. To facilitate transportation and preservation, it is compressed in steel cylinders to a pressure of about 900 pounds to the square inch, at which pressure the gas is liquefied.

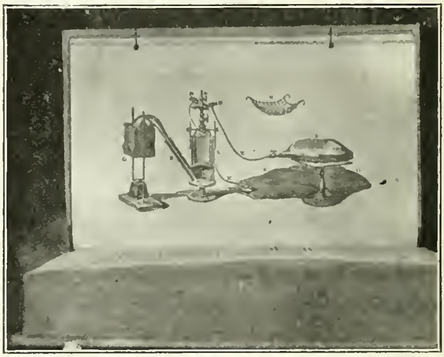

Fig. 1. Apparatus for the manufacture of nitrous oxid. From Silliman's *Chemistry*, 1830.

INTRODUCTION OF GAS OXYGEN ANESTHESIA

In 1868, Dr. E. Andrews, of Chicago, found that anesthesia induced by nitrous-oxid could be prolonged by a mixture of nitrous-oxid and oxygen. Hillischer, of Vienna, first used gas and oxygen in an apparatus capable of regulating the proportion of the gases. Sir Frederick Hewitt commenced the use of gas and oxygen in 1886. He put the administration on a practical basis and perfected an apparatus which is still in use.

ADVANTAGES.

The advantage of nitrous-oxid-oxygen anesthesia consists in freedom from after-effects. Recovery is immediate. There is no irritation of the kidneys, or the respiratory system. No fatty degeneration of the organs results. Changes in the blood are transient.

The resistance of the patient is not lowered. If there is an infection, his power is not wasted in fighting the after-effects of the anesthetic, but is ready to combat the poison. In fact, soon after the inhaler has been taken from the patient's face, all effects due to the anesthetic have passed away.

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* Read before the Providence Society of Anesthetists at the meeting of February 17, 1916.

Casto has found that "there is a tendency for the blood pressure to rise, but only when cyanosis appears. Hemoglobin is reduced, the blood index returning to normal after gas has been discontinued for from 20 to 30 minutes. The time for coagulation of the blood was decreased on an average more than one minute, returning to normal in about 20 minutes after discontinuance of the gas." (Dental Cosmos, October, 1915.)

On the contrary, Anders and Boston found a steady fall in hemoglobin for 24 hours after etherization, the index not returning to normal for several days. (Dental Cosmos, October, 1915.) Hamburger and Ewing found a marked decrease in the coagulation time of the blood following etherization, most marked from the seventh to the tenth day. The average fell from seven minutes before anesthesia to four minutes on the seventh day following. (*J. A. M. A.*, November 7, 1908).

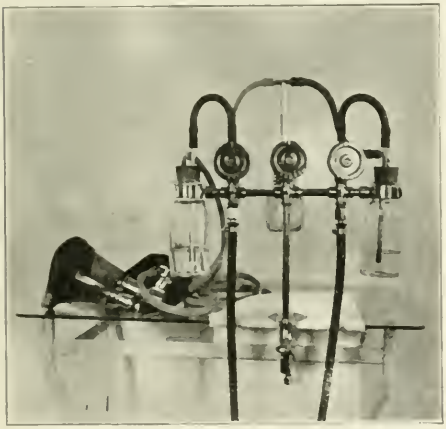

Fig. 2. Nitrous Oxid Oxygen Apparatus. Controlling valve unit attached to table.

DISADVANTAGES.

The disadvantages of gas oxygen in comparison with ether or chloroform consist of greater expense, the difficulty of securing perfect relaxation, and the narrow margin of safety, which confines the use of this anesthetic to the expert.

SAFETY.

In unskilled hands, as a routine anesthetic, nitrous-oxid-oxygen is undoubtedly more dangerous than ether. In the hands of the expert, also, the routine use of nitrous oxid-oxygen is attended by greater immediate danger than accompanies expert etherization. In selected cases, the expert can save many lives which would be forfeited under ether or chloroform anesthesia, by the use of nitrous-oxid-oxygen.

The following series of cases of nitrous-oxid-oxygen anesthesia have been reported:

Cases.	Deaths.	Observer.	Reference.
8,585	0	Gwathmey,	(J. A. M. A., Nov. 23, 1912, p. 1845.)
13,000	1	Jones,	(Ohio St. Jour. of Med., August, 1915.)
34,964	0	Crile and Lower,	(Anoci Association, p. 245.)
23,952	1	Teter,	(J. A. M. A., Nov. 23, 1912, p. 1849.)

Teter has collected 938,924 cases of nitrous-oxid, 32,172 cases of nitrous-oxid and air, and 190,724 cases of nitrous-oxid-oxygen anesthesia, a total of 1,161,820 cases, with two deaths. (Dental Cosmos, September, 1915.)

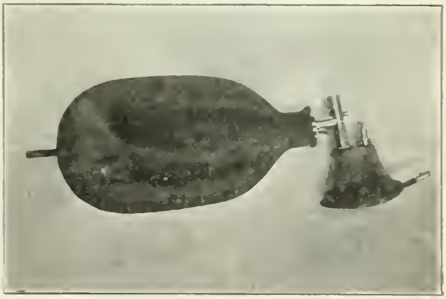

Fig. 3. The inhaler

Altogether, 21 deaths under nitrous-oxid-oxygen anesthesia have been reported in literature; 11 of these deaths were reported as due to the anesthetic.

Dr. Mosher, of Kansas City, has carried on an extensive correspondence concerning the safety of nitrous-oxid-oxygen. He finds that many deaths under this anesthesia have not been reported in literature. (*Am. Jour. of Obs.*, December, 1915, p. 1055; February, 1916, p. 352.) This conclusion is as inevitable in the case of nitrous-oxid-oxygen as with other anesthetics.

Mosher's conclusion that there is a disposition to conceal the dangers of this anesthesia is inexcusable. Among many papers dealing with the question, that of Teter on "The Limitations of Nitrous-Oxid with Oxygen as a General Anesthetic" (*J. A. M. A.*, November 23, 1912, p. 1849), states clearly the class of cases in which this anesthetic is not indicated, and allows that in case of a major operation when the services of an expert anesthetist with nitrous-oxid-oxygen are not available, he should prefer to take his chances with ether in the hands of an inexperienced person.

CONTRAINDICATIONS.

Gas oxygen is contraindicated in children under five years of age on account of the small size of the respiratory passages and the increased liability to asphyxial symptoms. For the same reason, it should not be used in cases of enlarged tonsils, cellulitis, or tumor of the neck, or any other respiratory obstruction. It is contraindicated by bad heart lesions with broken compensation, by aneurism, emphysema, and marked arterio-sclerosis. Nitrous-oxid-oxygen is not a satisfactory anesthetic when perfect relaxation is desired in healthy subjects.

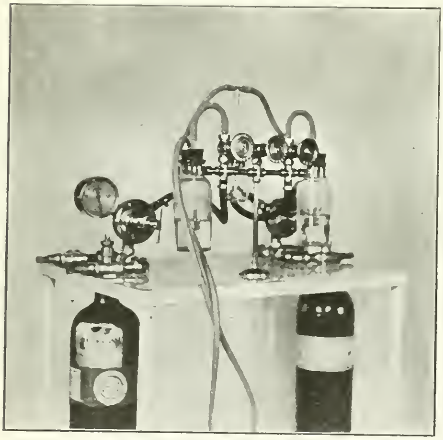

Fig. 4. Nitrous Oxid-Oxygen Apparatus permanently attached to table.

INDICATIONS.

On the contrary, this anesthetic is especially desirable in anemia and in all acute infections. With impaired kidneys and in respiratory affections, it should always be considered. In bad surgical risks, as in grave general peritonitis, or in the presence of shock, it is the anesthetic of choice. It should be extensively used in minor operations and manipulations and for operations on the extremities. In obstetrics, it should be used far more than at present. In Cæsarean operations, it is the anesthetic of choice. Only the simplest and shortest cases may be safely undertaken by the beginner.

APPARATUS.

In the literature of the last few years, 27 forms of apparatus for the administration of gas and of gas oxygen have been described. In 1909, Teter reported a series of 13,000 administrations of nitrous-oxid-oxygen covering a period of nine years. He used an apparatus providing for warming the gas and for adding ether vapor to the mixture. He perfected a nasal inhaler and called attention to the advantage of having two cylinders of each gas connected to the instrument. Gatch showed the harmlessness of rebreathing. Henderson showed the physiological advantage of rebreathing. McKesson evolved the principle of fractional rebreathing, saving the first part of each expiration and allowing the last part, laden with carbon dioxid and deprived of much of its oxygen, to escape. Boothby devised a simplified apparatus providing a regular flow of each gas at any rate desired with the flow of gases rendered visible. The combined supply and rebreathing bag was attached directly to the inhaler.

The gas oxygen apparatus of the present time are of two types. The first type of instrument is characterized by two bags, one for gas and one for oxygen. The patient, at each inspiration, draws in a mixture of gas and oxygen through valves which modify the percentages of the two gases. In the second type of apparatus, the gas and oxygen under pressure are introduced into one bag in the proportion required. The patient inspires from this bag the mixture already made. The instruments also differ in other respects: the use of reducing valves to control the high pressure of the gases as furnished in cylinders; devices for keeping the bags of the two-bag apparatus equally filled; heating devices for warming the mixture; attachments for vaporizing ether supplied by an automatic dropper or by passing the mixture over the surface of liquid ether in a container; rebreathing into a separate bag or into a supply bag; intermittent or fractional rebreathing; different forms of face piece with or without an air valve or an inspiratory valve.

NEW APPARATUS DESCRIBED

The nitrous-oxid-oxygen apparatus here described provides a definite flow of nitrous-oxid and of oxygen, each measured in liters per minute, to which may be added a definite flow of ether vapor. Two reducing valves, one for nitrous-oxid and one for oxygen, are provided. Each reducing valve is mounted on a double yoke. The cylinders of each gas, clamped into their yokes, set on the floor, not requiring any other support. The reducing valves furnish a supply of nitrous-oxid and of oxygen at a constant pressure of 10 pounds to the square inch. The reducing valves are connected with the controlling valves by rubber tubing.

A frame which supports the controlling valves and indicators is provided with a clamp which serves to attach this part of the apparatus to a table or chair, doing away with the need for a stand. On the frame are mounted three needle valves, two wash bottles, and a vaporizer of special construction. Oxygen passes through the valve and wash bottle on the left, and nitrous-oxid through the valve and bottle on the right. The wash bottles serve as indicators of the flow of nitrous-oxid and oxygen and also moisten the gas. Dials attached to the stems of the needle valves are calibrated in liters per minute of flow of nitrous-oxid and of oxygen. The middle needle valve transmits a stream of nitrous-oxid to a vaporizer which furnishes a constant percentage of ether vapor varied by changing the rate of flow of the gas. One liter of gas vaporizes in this way 5 c.c. of liquid ether in a minute. The controlling valve unit is connected with the inhaler by rubber tubing. The mixture of gases is made close to the inhaler. No mixing chamber is provided.

The inhaler has a face piece of celluloid with an inflatable rubber cushion and a cuff. The air valve on the inhaler is open when the gas is shut off and vice versa. The face piece may be adjusted to the face, so that the patient becomes accustomed to breathing through it before the anesthetic is introduced. The adjustable inspiratory valve provides for administration without rebreathing, for fractional rebreathing, or for intermittent rebreathing. The expiratory valve is mounted on the inhaler in plain sight and is controlled by a spring of adjustable tension. The supply and rebreathing valve is mounted directly on the inhaler. The inhaler may be quickly separated into parts which may be sterilized in boiling water, dried inside and out, and readily assembled. The wide mouth of the supply bag allows of its being turned inside out and dried.

With fractional rebreathing, the first part of each expiration passes into the supply bag and is rebreathed. The latter part escapes through the expiratory valve. The proportion of rebreathing varies inversely as the rate of flow of the mixture into the inhaler. This proportion can be closely estimated by noting the point in expiration at which the expiratory valve opens. Only enough tension on the expiratory valve is maintained to insure the filling of the bag before the valve opens. The apparatus may be packed in a 24-inch suit case for transportation. It may be permanently atached to a table for hospital use.

279 Benefit Street.

Book Reviews

A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.

The American Year-Book of Anesthesia and Analgesia. By Various Contributors. F. H. McMechan, A.M., M.D., *Editor.* Quarto; art buckram; India tint paper; p. 352. and 250 illustrations. Surgery Publishing Company, New York City, 1916. $4.00.

The Year-Book is another indication that anesthesia and analgesia are coming into their own. While the Quarterly Supplement provides a journalistic medium for the publication of the Transactions of the various associations and societies of anesthetists, the Year-Book collates the more ultra-scientific researches and the invaluable technical advances in these subjects.

The list of contributors to the initial volume is notable.

Lillie's chapter on the Physico-Chemical Basis of Anesthesia is the most exhaustive and authoritative exposition of the theory of narcosis so far published. His work in this connection is gradually securing him international recognition.

Casto revives the problems of Blood Changes under Anesthesia, and while contributing his personal investigations, includes in detail those of Crile and Menten on H-ion content and Mendenhall's on coagulation time as affected by different anesthetics.

Mann reviews the various theories of Shock and details his researches into its peripheral origin; while Gatch amplifies these experimental conclusions by applying them in a practical manner to Circulatory Disturbances under Laparotomy due to the Operative Procedure, Posture and Anesthesia.

Crile's *safety-first* procedure of intermittent clamping of the carotids in head operations is impressively fortified by his personal studies in Anesthesia, Anemia and Resuscitation. The lessons taught are invaluable to surgeon and anesthetist alike.

McKesson, writing from an experience of some 6,000 personal observations, gives a comprehensive resumé of the application of blood-pressure readings as a guide to the patient's condition under anesthesia, and more especially as an indication of what constitutes operative trauma.

Henderson reconstructs the physiology of respiration in respect to anesthesia and the incidence of acapnia, apnea and anoxhemia, and his chapter is illuminating in that it dovetails his theories into the underlying physiology of anesthesia in such a manner as to obviate the conflict of opinion, which his contentions have heretofore aroused.

Miller, who may almost be termed the statistician of the subject, contributes an interesting paper on Mortality under Anesthetics and includes many considerations aside from mere tables of figures.

The fact that deaths from chloroform still form the vast proportion of fatalities under anesthesia makes Levy's investigation of Cardiac Fibrillation and Chloroform Syncope particularly apt, and calls for the abolition of adrenalin in connection with chloroform anesthesia and a modification of the tendency to administer this anesthetic in attenuated percentage vapors.

Likewise the incidence of Late Chloroform Poisoning, and its dependence on the action of the alkyl halids is handled in a masterly manner by Evarts Graham.

Ferguson, Burdick and Jarvis deal with the psychic and esthetic factors of anesthesia, and their suggestions regarding the handling of patients, the use of music and the influence of surroundings are worthy of being more generally utilized.

Hogan, who has collaborated with Fischer on the causes of edema, gives a vital interpretation of Kidney Function under Anesthesia in this connection, and suggests not only many prophylactic and remedial measures for meeting emergencies, but also includes valuable dietetic pointers.

That portion of the Year-Book devoted to the *science*

(*Continued on page 91*)

American Journal of Surgery

QUARTERLY SUPPLEMENT *of* ANESTHESIA *and* ANALGESIA

Surgery Publishing Co.
J. MacDONALD, Jr., M.D., President and Treasurer
92 WILLIAM STREET - NEW YORK, U. S. A.

Original Articles, Clinical Reports and Experimental Researches on the Theory and Practice of Anesthesia and Analgesia, as well as pertinent Society Transactions, are solicited for exclusive publication in this Supplement.

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Cincinnati, Ohio, U.S.A.

JULY EDITORIALS. 1916

ANESTHESIA, ANALGESIA AND THE WAR.

Chloroform, owing to its efficiency, compactness and ease of transportation, retains its erstwhile superiority, as *the* anesthetic of war. The bulk and explosiveness of ether render it less desirable as a routine agent. That a staggering amount of these anesthetics has been used since the beginning of the world's war, is evidenced by the exhaustion of the reserve supplies in the home markets and the rapid rise in prices. The Red Cross has materially assisted in depleting local supplies by its humanitarian shipments abroad. However, hospitals in the United States are virtually being saddled with an enormous war tax on necessary drugs and surgical supplies, although we are not participants in the conflict.

It is interesting to note that French surgeons are turning to ethyl chlorid as a remarkably satisfactory anesthetic for brief narcoses, necessitated by the dressing of unusually extensive and painful wounds. They are also using the Gwathmey technic of ether-oil colonic anesthesia, especially for operations about the head, face and neck. Crile took a supply of nitrous oxid-oxygen with him to France to demonstrate its superiority over all other anesthetics in surgery complicated by shock. But it proved difficult of administration in some instances on account of the mild, alcoholic taint of the wine-drinking soldiers. Compressed gases are too cumbersome and expensive as anesthetics in war surgery; although nitrous oxid-oxygen will probably hold its own in the larger base hospitals, when a supply is available. It seems a travesty on civilization that some of the manufacturers of nitrous oxid for the alleviation of suffering humanity should have turned to the manufacture of chlorin for *gassing* the enemy. A campaign, on the part of these manufacturers, to extend the use of nitrous oxid-oxygen anesthesia would have been better for all concerned.

Shock has been very prevalent as a complication of this war's surgery. It has been combated by camphor in oil and morphin injections in the field and by rather complete and persistent morphinization at the base hospitals. Strange as it may seem, shell-shock has been treated by general anesthesia with considerable success. Although this is in line with the treatment of electric-shock monoplegia in a similar manner. Occasionally exsanguination has been counteracted by saline infusion directly into the severed vessels during amputation. Coagulen has established itself as a dependable prophylactic for the incidence of hemorrhage and its control. The *axillary* sup has also proved to be the most efficient method of hypodermoclysis.

Early in the war the Germans announced an apparatus for handling large numbers of cases under local analgesia. Owing to the character of the war-wounds and the prevalence of infection, local analgesia has not been used as extensively as had been anticipated. The supply of novocain is almost at the vanishing point in this country, and surgeons and dentists have had to turn to cocain (of which there is none too much), and quinin and urea hydrochlorid. Efforts have been made to influence the German government to raise its embargo on the exportation of certain drugs. It may be, however, that the cargo of 15,000 tons of coal-tar dyes, released for export, recently, may contain a sufficient supply to tide over our requirements until the end of the war. Owing to the abrogation of treaty and patent rights, England, at the beginning of the war, began the manufacture of a substitute, and anocain is now obtainable in any desired quantity in Canada.

The drug situation in the United States, precipitated by the world's war, calls for action on the part of Congress, to so modify existing patent laws, so that necessary products must either be manufactured in this country, or in case of the cessation of importation for any cause, patent rights would lapse, pending the resumption of the supply. A concerted action on the part of the medical and dental professions might accomplish much in this respect. Several state associations have initiated such a movement, but it requires the full force and activity of national organizations to make such a reform effective.

In the present trend toward preparedness it seems advisable that expert anesthetists, medical and dental, should form a definite percentage of the membership in the medical reserve corps. Anesthesia in the world's war has involved a greater risk of life than in any previous conflict, and numberless cases have presented, in which the technic of administration was extremely difficult. Expert anesthetists are as vital a necessity in the surgery of war as in the surgery of peace.—F. H. M.

Book Reviews

(*Continued*)

of anesthesia and analgesia is concluded by Warner's illustrated article on the manufacture of a purified nitrous oxid for hospital use. Any hospital desiring to install a plant will do well to follow Warner's plan, as it has been adopted in detail by several of the largest commercial manufacturers.

An exhaustive article on Ether-Oil Colonic Anesthesia, by its originator, Gwathmey, opens that portion of the Year-Book devoted to the *practice* of anesthesia and analgesia. It is interesting to note that this new technic has become so rapidly popular that it is being used in many of the war hospitals, especially for operations on the head and neck.

As ether is still the routine anesthetic, Rice illustrates the Perfected Methods of its use; and details those improvements that time and experience have made in some consistently abused technics.

Guedel, who was among the first to use nitrous oxid analgesia in minor surgery and obstetrics, adapts the newer anesthesia for normal and pathological labor to the capacity of the general practitioner, and for the specialists, he offers a thorough consideration of its mode of action under all circumstances. Polak reviews the adaptability of Alkaloidal Amnesia for the same purpose.

The surgeons, anesthetists and dentists who have to deal with oral surgery will appreciate the chapters on these phases of the subject by McMechan, who considers the Nasal Administration of Nitrous Oxid-Oxygen; Barber, who illustrates the handling of the Obstreperous Dental Patient; DeFord, who describes the use of Somnoform in Dentistry; Riethmuller, who elaborates on his Further Researches in Novocain-Suparennin Anesthesia, and Kurt Thoma, who applies the Intra and Extra-oral Methods of Conductive Anesthesia to dental procedures, especially apiectomy, and uses *x*-ray pictures to illustrate the position of the needle during injection. Hertzler, who has done more to solve this problem than any other investigator, concludes this symposium with a consideration of Local Anesthesia and After-Pain.

Local anesthesia in its essentially surgical aspects receives attention in the articles by Allen on Prostatectomy; Hirschman on Rectal Surgery; Souther on Hernia, and Harris on Injecting the Gasserian Ganglion. The articles of Allen, Hirschman and Souther are profusely illustrated and many new points in the technic of infiltration as well as the surgical conduct of the operative procedures under local anesthesia are given.

The volume concludes with Porter and Smith's personal researches in spinal anesthesia and Smith's application of the method to Urology.

If the succeeding volumes approach the initial in scope and character of contents, authority of contributors, and wealth of illustration, the Year-Book should find a place on the desk of every progressive surgeon, specialist, anesthetist, dentist and research-worker, as an invaluable reference volume on the current advances in the science and practice of anesthesia and analgesia.

A Manual of Surgical Anesthesia. By H. Bellamy Gardner, M.R.C.S., L.R.C.P., London. *Second Edition;* cloth, pp. 220. 16 plates and 36 illustrations. Wm. Wood & Co., New York.

In his Second Edition, Gardner has remodelled and in part rewritten his manual, especially the chapter relating to the Cardinal Principles for Anesthetic Administration. Several chapters of new material, describing the methods of producing spinal analgesia, ether infusion and intratracheal insufflation anesthesia, and also the system of anoci-association, have been added, with new figures and plates to illustrate them.

Gardner is still an ardent advocate of the obvious and he reiterates the importance of maintaining the freedom of the airways during anesthesia.

The entire field of general anesthesia is adequately covered, both for the surgical as well as for the dental anesthetist. If he is anything, Gardner is a master-technician and his methods of inducing, maintaining anesthesia for every conceivable operative procedure should be studied with attention and may be followed with routinely satisfactory results. His advice in all instances is intensely practical and he handles the intricacies of his subject in a most understandable manner.

He is at his best in developing the team-work, so necessary between operator and anesthestist, in the administration of anestesia for oral surgery. While the English apparatus illustrated seems crude in comparison with some American devices for administering nitrous oxid and oxygen, Gardner's technic is painstakingly detailed, accurate and withal simple.

No other volume on anesthesia carries such a trenchant lesson of self-perfection to the reader, fortified with so many means for attaining proficiency.

Proceedings of the Royal Society of Medicine—Section of Anesthetics: Vol. VIII Octavo, Cloth, pp. 24 Longmans, Green & Co., London, 1915.

This diminished volume is one of the pathetic reminders of the inroads of the world's war on the scientific activities of the Continent. The Transactions of the meetings of February 5 and March 5 are printed. The only stated paper is one on "Anesthetic Ether," by Horace Finnemore, and the remainder of the volume is devoted to two discussions, one on "The Methods of Induction of Anesthesia," the other on "The Influence of Preliminary Narcotics." It is to be hoped that an early peace will shortly bring about the resumption of the Section of Anesthetics.

The Self-Administration of Nitrous Oxid. By Arthur E. Guedel, M.D., Superintendent Protestant Deaconess Hospital, President Indianapolis Society of Anesthetists and Fellow of the Interstate Association of Anesthetists. Paper, pp. 80, with 4 illustrations. The Author, Indianapolis, Ind., 1915. $1.00.

As the pioneer of the *self-administration* method of nitrous oxid anesthesia and analgesia, Guedel has condensed a vast amount of personal experience in his brief, but interesting, monograph. After discussing the chemistry and physiology of nitrous oxid and its effects on the organs and systems of the body, Guedel launches into a differentiation of analgesia and narcosis and shows how the self-administration of analgesia is available for many procedures commonly conducted under surgical narcosis. He favors air an a diluent, because air and nitrous oxid suffice for all the purposes to which he has put the method. Aside from its efficiency it is one of the most economical methods of analgesia.

Considering the fact that Evans of Buffalo is using analgesia as a routine in major surgery, it is not surprising that Guedel finds the air-nitrous oxid analgesia available for all the exegencies of minor surgery and obstetrics, and dentistry. The chapters devoted to the technic of administration are full of valuable pointers. The handling of emergencies, accidents and complications is considered in detail and prophylactic measures are indicated. The monograph closes with a description of the simple apparatus which Guedel has found amply serviceable in his work.

This volume will appeal to those who wish a brief, concise and practical exposition of the self-administration of nitrous oxid.

The Art of Anesthesia. By Paluel J. Flagg, M.D., Lecturer in Anesthesia, Fordham University Medical School; Anesthetist to Roosevelt Hospital; Instructor in Anesthesia to Bellevue and Allied Hospitals, Fordham Division; Consulting Anesthetist to St. Joseph's Hospital, Yonkers, N. Y., and formerly Anesthetist to the Woman's Hospital, New York City. Cloth, 341 pages, 136 illustrations. J. B. Lippincott Co., Philadelphia and London. 1916. Price, $3.50.

Flagg's book is intensely original. He approaches his entire subject from a personal viewpoint and develops it from the results of a large experience. Flagg maintains that anyone can administer anesthetics but that the *art of anesthesia* implies an intimate knowledge of general medicine, pathology, surgery, therapeutics, psychology and special branches. The necessity and value of this knowledge is continually indicated in the text.

The history of anesthesia is briefly reviewed and considerable new material about Dr. Crawford W. Long and his use of ether introduced. A resume of the entire field of general anesthesia follows. A classification of the stages of anesthesia, based on circumstances present in all methods and common to all anesthetics, with regard to induction, maintenance and recovery, is given in detail and developed by means of a series of original charts and tables. This classification forms a basis upon which the students or practitioner may intelligently attack the problems of the signs of anesthesia, which control the administrative phases. Flagg applies the researches of Connell and Boothby on anesthetic tensions to the proper interpretation of his charts.

Etherization is exhaustively handled. The various methods of administration, oral, intrapharyngeal, intratracheal, rectal and intravenous, are fully discussed. The other general anesthetics receive due consideration, especially nitrous oxid in combination with oxygen and ether and in sequence or association with other methods.

Local and mixed anesthesia are touched upon. Especial attention is paid to preliminary medication, carbon dioxid rebreathing and the control of untoward incidents. Flagg concludes with a chapter on the Point of View of the Patient, which is illuminating.

The volume is clearly printed on special paper, and elaborately illustrated. Various postures are pictured in detail.

To those who wish to be stimulated into a review of and a newer outlook upon some fundamentals in anesthesia from an original viewpoint, Flagg's book will come as a welcome relief from the text-books which are compilation from previous works

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

AMERICAN ASSOCIATION OF ANESTHETISTS.

The Fourth Annual Meeting of the American Association of Anesthetists was held in Detroit, June 12, with the largest and most enthusiastic attendance since the organization. The following officers were elected for the ensuing year: President, Dr Walter M. Boothby, Boston, Mass.; Vice-Presidents, Dr. F. W. Nagel, Montreal, Canada, Dr. Albert H. Miller, Providence, R. I., and Dr. Mary Botsford, San Francisco, Cal.; Secretary-Treasurer, Dr. James T. Gwathmey, New York City; and Members of the Executive Committee, Dr. Ansel M. Caine, New Orleans, La., and T. Drysdale Buchanan, New York City.

All the stated papers of the scientific program were read, without exception and extensively discussed. As these will be printed in full in the SUPPLEMENT, they need not be detailed in this report.

One of the interesting incidents of the meeting was an invitation extended Dr. S. J. Meltzer of the Rockefeller Institute to speak to the Association on the anesthetic value of the magnesium salts. Dr. Meltzer incidentally mentioned that Dr. Peck of New York City had already operated his third successful case under magnesium sulphate anesthesia, administered intravenously. One of these operations was a double herniotomy. He pleaded for caution in the use of this new method of anesthesia until an absolutely fool-proof method of administration had been devised. The value of the magnesium salts in tetanus was also emphasized.

The following new members were admitted: Drs. Chas. Cabalzar, Indianapolis; E. L. Brady, Marion, O.; Samuel Johnston, Toronto, Can.; Albert Ehrenfried, Boston; Wm. Branower, New York City; Geo. P. Tolman, Watsonville, Cal.; Lillian B. Mueller, Indianapolis; Abram Liebovitz, New York City; R. S. Adams, San Antonio, Texas; A. V. Wenger and John H. Evans, Buffalo, N. Y.; E. Klaus, Cleveland, O.; Edw. Remy, Jr., Mansfield, O.; Ritter Daniel, Punxsutawney, Penn.; Lincoln F. Sise, Boston; Reuben Mauretts Grand Rapids, Mich.; H. M. Spofford, Batavia, N. Y.; R. Goodloe McGahey, Birmingham, Ala.; J. E. H. Atkeisson, Chicago, Ill.; Worth E. Yankey, Atlanta, Georgia; Lloyd R. Allen, Colorado Springs; Layman S. Hapgood, Cambridge, Mass.; T. A. Dean, Casper, Wyoming; Alex. S. McCormick, Akron, O.; Mary Mulcahy, Chicago, Ill.; Edw. L. King, New Orleans; Frances Haines, Chicago, Ill.; Myra E. Babcock, Detroit, Mich., and Clarence L. Candler, Detroit, Mich.

The Association Banquet was served in the Roof Garden of the Hotel Tuller and was a very delightful affair. Dr. Gatch, the retiring President, acted as Toastmaster. Dr. Clarence L. Candler spoke on "Detroit the Dynamic." Other speeches were made by Drs. Boothby, Nagel, Ehrenfried, McKesson, Mytinger, Herb, Remy, McLean and McMechan in a discussion of the policies of the Association. A committee consisting of Drs. Boothby, Isabella C. Herb and F. W. Nagel was appointed to investigate the teaching of anesthesia in medical schools and colleges and to report on some plan for advancing such teaching and also in establishing some uniform method of training internes in the hospital anesthetic service.

The next meeting will be held just previous to the A. M. A. meeting in New York City, 1917.

SECOND ANNUAL MEETING INTERSTATE ASSOCIATION OF ANESTHETISTS.

A great deal of interest is being manifested in the Second Annual Meeting of the Interstate Association of Anesthetists in Louisville, Ky., July 26 and 27, in conjunction with the National Dental Association.

Aside from the regular scientific sessions, the Joint Meeting with the National Dental Association in a Special Section on Anesthesia for Oral Surgery, and an Historical Section, interspersed with a delightful musicale, are two features of the meeting that are attracting widespread attention.

Also the Association Dinner on the evening of July 26, at the Hotel Seelbach, will be an enjoyable event. Dr. F. G. DuBose of Selma, Ala., the inimitable teller of "colored anecdotes," will be toastmaster and will deliver "Some Smokes." Dr. G. A. Hendon of Louisville, Ky., famed as one of the postprandial celebrities of the Blue Grass region, will dilate on "Lightningbugs," and express his opinion of people who carry their headlight on behind. That genial dentist, Dr. John R. Callahan of Cincinnati, will forsake research for the nonce and put-over some "Jaw-Breakers," including the one about octogenarian optimist, who was worse afflicted than Job, but more patient and happy because he still had two teeth, and thank God! they hit. Mrs. Laurette McMechan will discourse on almost everything from "Soup to Nuts," while Dr. George F. Butler of Mudlavia will bespatter the subject of "Woman's Rights—or Privileges," with several tons of mud, impregnated with his usual number of scintillatingly intellectual maché units of unadulterated radium sulphite.

Dr. A. L. Henderson, Atherton Bldg., Louisville, Ky., will co-operate with those who have not yet made their hotel reservations.

For further particulars and Dinner Reservations, address F. H. McMECHAN, M.D., *Sec'y-Treas.*,
Avon Lake, Ohio.

PROVIDENCE (R. I.) SOCIETY OF ANESTHETISTS.

The meeting of February 17, 1916, was called to order by Dr. A. H. Miller, the President. The question of changing the qualification of membership was raised and discussed. As it is now, active members are limited to those on the staffs of the various hospitals or those qualified as specialists in anesthesia. Associate members might be any others who were interested in anesthesia. The question was laid on the table for future consideration.

The following officers were elected: Dr Raymond C. Bugbee, President, and Dr. B. H. Buxton, Secretary.

Dr. A. H. Miller then read a paper on Nitrous Oxid-Oxygen Anesthesia: With Description of a New Apparatus (herewith printed in the Supplement). A general discussion of the subject followed, in which

Dr L. Kingsman spoke of the usefulness of nitrous oxid-oxygen in short anesthesia, especially in office work. As a routine of anesthetic, its cost and the necessity for expert administration, militated against its use.

Dr Charles O Cooke spoke of Dr Crile's experiments with nitrous oxid on dogs, and of his conclusions that there was less shock from this method of anesthesia than any other. He also emphasized the advantages of the preliminary use of morphin.

Dr Eddy mentioned his personal experiences with nitrous oxid-oxygen in dentistry, also the use of air and oxygen. He detailed the technic of self-administration with the nasal inhaler and reported very satisfactory results.

Dr E Porter detailed his experiences with nitrous oxid in obstetrics, emphasizing its utility in normal as well as instrumental deliveries.

Dr Miller then gave statistics of some 200 cases observed in regard to post-operative nausea and vomiting. The cases in which straight nitrous oxid-oxygen or straight ether were administered, showed less vomiting than other mixtures, combinations and sequences.

Dr Adams, from a consideration of 50 cases, corroborated Dr Miller's findings.

A collation followed the scientific program.

B. H. Buxton, M D., *Secretary.*

CAUDAL ANESTHESIA IN GENITO-URINARY SURGERY.*

Bransford Lewis, B.S., M.D., F.A.C.S.,
and
Leo Bartels, M.D., F.A.C.S.,
Genito-Urinary Surgeons to St. John's Hospital,
St. Louis, Mo.

In the field of genito-urinary surgery particularly, we have felt the need of a satisfactory anesthetic—one that will carry the aged and decrepit prostatic through his operative crisis, for instance, without adding to his enfeeblement or increasing his sufferings. Spinal anesthesia was proposed as a boon in this direction, but has been found woefully lacking in safety. We consider it the most dangerous of all methods of anesthesia in such cases.

Working on the allusion to sacral anesthesia given by M. L. Harris ("Nerve Blocking," Surg. Gyn. and Obstetr., February, 1915) during the past eight months, we have studied the regional anesthesia (analgesia) of the pelvic organs contributed by infiltrating the sacral nerves as they lie within the sacral canal, and our results have been strikingly successful from our standpoint and so gratifying to the patients that we are impelled to present them, anticipating its adoption by the profession when it becomes more widely understood and used.

ANATOMICAL CONSIDERATIONS.

Spinal Nerves.—There are thirty-one pairs of spinal nerves. Leaving the cord, they emerge from the bony enclosure through the interverebral foramina on each side and are thence distributed to their several destinations in the body. The spinal nerves are divided into five groups—the cervical, dorsal, lumbar, sacral and coccygeal.

The Sacrum.—Although composed of separate segments (vertebræ) in early life, the sacrum becomes blended into one bone in the adult. For present consideration its most interesting features are its *central canal* and *foramina.* The canal is a continuation of the spinal canal above. It lodges the sacral nerves, which pass through the several anterior and posterior foramina of the bone. The anterior group, converging and running forward within the pelvis on the surface of the pyriformis muscle, forms the *sacral plexus.* Its ultimate distribution is to structures of the pelvis and lower extremities, parts of the body that are rendered amenable to local or regional anesthesia by methods about to be considered.

The central or sacral canal is enclosed in bony walls except at its lower end: here, through non-development of the foramina and spinous processes, the posterior bony wall is lacking and is replaced by a ligamentous covering. This is the sacral hiatus. Through this ligamentous covering is introduced the hypodermic needle that is to convey the fluid for anesthesia. Occasionally the hiatus is left open for nearly the lower half of the sacrum, offering a larger opening for the puncture by the needle. Sometimes, on the other hand, it is covered almost to the lower end, and narrows the field of accessibility.

Caliber and Curve of the Canal.—The canal is triangular in form and relatively large above, grows smaller and flattened below. It follows the forward curve of the sacrum, which is variable in different subjects and in the sexes. In the male the curvature is more evenly distributed over the whole length of the bone, and is greater than in the female, while in the latter the bone is projected more obliquely backward for the increase of the pelvic capacity pertaining to that sex. These variations also may have an influence on the ease of introducing a straight hypodermic needle, the axis of the curve having to be threaded by compensating movements while advancing the needle.

Distribution of the Nerves from the Sacral Plexus.—The chief divisions of the sacral plexus are the sciatic and pudic nerves. The pudic terminates in three branches: (1) The dorsal nerve of the penis; (2) the perineal nerve, and (3) the hemorrhoidal. These supply the skin and structures of the penis, scrotum, perineum and anus, the muscles of the urethra, perineum and prostate and bladder, and inner surface of the thighs.

PREPARATION OF SOLUTION.

In our work with caudal analgesia we have used various drugs as aids in local analgesia, such as the magnesium salts, potassium sulphate, calcium chlorid and adrenalin. The magnesium salts were successfully used in spinal anesthesia for a while, but later gave way to the more effective analgesic drugs. For caudal analgesia they were not satisfactory. Calcium chlorid was used in conjunction with novocain, chloretone and adrenalin by Harris. He used the calcium chlorid to prolong the analgesic properties and adrenalin was used for the same purpose. Potassium sulphate was used by Hoffman to prolong the analgesic properties of the various drugs so used, and, in our opinion, it is the most successful in lengthening the duration of analgesia. By adding potassium sulphate to the analgesic fluid a much weaker novocain solution than otherwise can be used. Adrenalin is also used for retaining the effects of the drug. Adrenalin must be added to the solution just before using it, as it is unstable and becomes ineffective if added and allowed to stand for over two or three hours, as indicated by the solution turning a reddish-brown color. In addition, chloretone has been added to the solution to the point of saturation, which is eight-tenths of 1 per cent. This drug although a local anesthetic and a marked antiseptic, has been discontinued by us because of its irritating effects upon the tissues injected and also because analgesia has seemed just as good without it. The preparation of the solution seems a simple matter, but the fact that the action of the novocain may be lessened by the addition of other drugs to the solution impels us to take the extra precaution of making up separate solutions—novocain, 1 per cent.; potassium sulphate, 1 per cent.—combining them in equal quantities at the time of operation. The combined solution contains a half of 1 per cent. each of novocain and potassium sulphate, to which one or two drops of adrenalin are added to each thirty cubic centimeters of solution. In making the solution, freshly distilled sterile water should always be used.

HISTORY AND PROGRESS OF EPIDURAL SACRAL ANESTHESIA OR CAUDAL ANALGESIA.

Epidural injections were first used by Cathelin, of Paris, in 1901. He conceived the idea of medicating the nerves in this region for various pelvic neuroses, as neuralgia, sciatica and urinary incontinence. The solutions that he used ranged from sterile water to saline solution containing various local analgesic drugs. One to eight ounces of solution could be used and the injection was repeated several times. His results in urinary incontinence, though hard to explain, were very good.

In 1910, Lawen began a systematic application of Cathelin's epidural injections with considerable success.

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* Read before the Mississippi Valley Medical Association, October 19-21, 1915.

Later Bull used it sixty-four times. He injected through the caudal hiatus, using 20 c. c. of a 2 per cent. of novocain solution with epinephrin. His results were very good in forty-seven cases, but in 15.6 per cent. of the cases no analgesia was produced.

SUCCESS AND FAILURE.

The difficult cases for this method are the obese, the very nervous, the hysterical and children. Läwen has advised against its use in the elderly, but we have found it particularly advantageous for them. However, the nervous type of patient should have a preliminary sedative, such as pantopon, grain one-third, hypodermatically, which we have used with eminent success. The use of caudal analgesia is not contra-indicated in those children who are susceptible to reason. Very fleshy women are most difficult to work with, owing to the increased adipose tissue over the sacrum, obscuring the anatomical landmarks.

TECHNIC FOR CAUDAL ANALGESIA.

The patient is placed on the right side with head slightly elevated and is instructed to bow the back by bringing his knees and chin as closely together as possible. The area over the sacrum, buttocks and lower lumbar region is cleansed with benzine, dried and painted with iodine solution.

Having first infiltrated the skin area over the lower end of the sacral canal or caudal hiatus with a few drops of the analgesic fluid, the long needle fitted with trocar wire is inserted into the hiatus. This opening is sought for with the finger and is always found just below the last sacral spine or lower end of the tubercular ridge, and usually just above the articulation of the sacrum and coccyx. The rudimentary spinal processes of the sacrum can usually be easily differentiated. The first is very prominent and distinct from the others; the second and third may be separate, but are usually united into a ridge running downward. The fourth almost always and the fifth always remains undeveloped. The remaining gap resulting from the failure of the laminæ to meet in the midline is called the sacral hiatus and is covered by ligaments which may readily be felt while introducing the needle at this point. Owing to the variations in the curve of the sacrum in different individuals there can be no fixed angle designated as formed by the needle and the surface of the body at the point of injection. However, it is always more than a right angle with the body surface above the sacral hiatus. Latterly we have been using a curved needle. The curved needle is an improvement over the straight needle in that by merely turning the needle from side to side the analgesic fluid can be accurately applied to the sacral nerves as they emerge from the anterior foramina on either side. When using the curved needle half the desired quantity is injected on one side; it is then turned toward the opposite side and the remainder is injected. The curved needle has another advantage over the straight needle in that it can be made to follow a more sharply curved sacral canal which might not be permeable to the straight needle.

The needle used should be at least four to five inches in length and not of too large caliber. It is inserted upwards into the sacral canal for two or two and one-half inches.

Before injecting the analgesic fluid we must be sure that the needle has not entered the spinal canal or one of the large veins constituting the plexus about the cauda. If the spinal canal has been entered spinal fluid will usually escape after the withdrawal of the obturator from the needle, while, on the other hand, if a vein has been punctured blood will drop from the needle. If neither blood nor spinal fluid escape, the analgesic fluid still should not be injected until we have tested the location of the end of the needle by injecting a few drops of normal saline solution through it. The authors have had a very unpleasant warning on this point which could have been obviated by such preliminary injection of saline solution. In this case the needle was introduced in the usual manner and injection was begun, but after about 10 c.c. was injected the patient complained of weakness, extreme pain in the head and chest, and his pulse became somewhat weak and irregular. The injection was stopped at once, and, on detaching the syringe, blood was seen to run from the needle. The patient soon recovered and left the hospital about three hours later, feeling very well. In this case the needle had entered a vein, but the blood was retarded from flowing out by a small clot or piece of tissue which had occluded its lumen. If saline solution had been injected before using the analgesic fluid the obstruction plug would have been washed out and the blood escaping from it would have indicated a vein had been entered. If either the spinal canal or vein has been punctured the position of the needle should be changed before injecting the analgesic fluid. Having the needle properly placed, 30 to 90 c.c. of analgesic fluid is slowly injected. Analgesia becomes complete in from ten to thirty minutes, and lasts several hours. By increasing the quantity of fluid the entire sacral plexus may be included.

BROADENING OF THE FIELD OF OPERATING FOR GENITO-URINARY SURGERY.

To the genito-urinary surgeon this method of analgesia is especially valuable in that it may not only be used for those painful cystoscopies which are otherwise so difficult and unsatisfactory, but by increasing the amount of solution injected it is used for perineal and supra-pubic operations on the bladder and other such major surgery.

Caudal injection does not give analgesia above the symphysis; therefore, in doing supra-pubic cystotomy it is necessary to employ direct local infiltration of the abdominal wall until the bladder is reached, but it will be found that the analgesia will be sufficient from here on to enucleate the prostate or do any other surgical work about the bladder.

We have used this method seventy-six times in work ranging from cystoscopy to external urethrotomy and supra-pubic prostatectomy, with exceedingly gratifying results.

To estimate the important advantages of caudal analgesia we must compare it with other forms of anesthesia, such as that from chloroform, ether, nitrous oxid, nitrous oxid and ether, and spinal anesthesia. Chloroform, excepting in obstetrical work, has practically been discarded on account of its dangers. Many obstetricians no longer make use of it. Nitrous oxid, combined with ether when necessary, is recognized as being the safest anesthetic when given by an expert. Spinal anesthesia, essentially a local anesthesia, still has its adherents and is still used extensively by some surgeons. But the popularity of this method has had a sudden rise and likewise a sudden fall. From our experience and that of surgeons with whom we have conferred, we consider this the most dangerous of all methods of anesthesia. When spinal anesthesia works well and proves safe it is all that can be desired of anesthesia. But when its danger signs once become evident, we are more helpless than in any other form of anesthesia.

It must be admitted that in some surgical clinics N_2O-O, alone or with ether, is proving itself a very safe and satisfactory method of anesthesia for bad risks.

There have been no bad results or fatalities reported following the use of epidural injections, sacral anesthesia or caudal analgesia.

ADVANTAGES.

The chief advantages of caudal analgesia are: Extreme safety and absence of unpleasant or dangerous aftereffects, as nausea, vomiting, pneumonia, etc. It has enabled us to operate on a class of patients in whom the risk of using general anesthesia would have been too great.

We have been so well impressed with the success of the method during six months' use of it that we believe it is destined to change largely the surgery of the pelvis, especially for the aged, feeble and decrepit. Prostatectomy is at once relieved of one of its greatest objections. The patient goes through the operation without shock, without nausea or vomiting, without menace to heart or lungs, and may be as comfortable after its performance as he has been before it.

The term analgesia as applied to this procedure has been used in preference to anesthesia. In many cases tactile sensation is not completely lost, though pain in the same area is entirely abolished.

Newer Apparatus

PRACTICAL ANESTHESIA, SHOWING A NEW ETHER APPARATUS*

By Ben Morgan, M.D.,
Chicago, Ill.

We have long noted that the deleterious after-effects of an ether anesthesia are in proportion to the ease with which that anesthesia is induced, and the steadiness with which it has been continued during the operation. The minimum amount of anesthetic used to keep the patient in the best possible condition for the operator to do his work is the object we wish to attain in the use of ether. To this end the condition of the ether as it reaches the respiratory tract is of the utmost importance. Only pure ether vapor mixed with proper proportions of pure air should enter the patient's respiratory tract, and the minimum amount of this mixture should be used. Ether vapor raised slightly in temperature has been shown to be very important, in order that the after-effects of the anesthetic shall be minimized, namely, shock, nausea and vomiting, excitability and a prolonged unnecessary sleep after the operation has terminated. To accomplish just these points has consumed no little attention of surgeons and anesthetists throughout the world. Various devices have been constructed, which are complex, expensive, fragile and bulky. Some of these devices entail an expense of two or three hundred dollars, and are almost too large for transportation.

I have here an apparatus, constructed upon the basis of simplicity, durability, portability, efficiency and economy.

The large evaporating chamber affords enough evaporating surface to give concentrated ether vapor sufficient to anesthetize any patient. Ether vapor is now concentrated, and it only remains to pipe this vapor to the patient's respiratory tract. The power used to transport this ether vapor to the patient's respiratory tract is furnished by the patient himself. The stimulating effect of the ether upon the respiratory tract offsets whatever overwork there may be produced by the inhalations of the patient through the apparatus.

Of course, this ether vapor is too strong to begin the induction of anesthesia, and some means of regulation must be established. On the face inhaler there is an ordinary air-valve, which, when opened, admits pure air, with possibly only a trace of ether vapor. When the valve is closed, the concentration of ether vapor is equivalent to that of a strong drop method. Any point between open and closed represents the percentage of pure air to ether vapor. Two other valves, one on the face inhaler, the other in the aluminum casting, are so arranged that only a one-way flow of the ether vapor is possible. The inside diameter of the valves and tubing is large enough to minimize the resistance of the passage of air through the apparatus. By means of this one-way flow of ether vapor, there is no rebreathing.

This feature of no rebreathing I claim to be a most important point in ether anesthesia, and present the records of thousands of soldiers and over two thousand hospital patients as proof. That is to say, rebreathing in an ether anesthesia is wrong in principle, wrong in practice, and should be abandoned.

The fact that rebreathing vitiates the air in assembly halls is so well-known that laws have been enacted to enforce proper ventilation, when more than 2/100 of 1 per cent. of nitrogenous product is discovered in this air. Why should we, then, as sanitation experts, fall behind in the science of ventilation and use antiquated methods, with their closed rubber masks, and the consequent rebreathing, in so important a field as anesthesia?

The four jar mouse experiment shows what it will do for the poor mouse. When the exhaled air containing carbon dioxid and the nitrogenous excretion is passed simultaneously from mouse No. 1 to mouse No. 4, No. 4 dies. But if we add to No. 4 pure carbon dioxid in quantities double that in the first condition, he lives and does well on it. Thus, carbon dioxid is a respiratory stimulant, and is all right to use in skilled hands, but that carbon dioxid should not be from the exhalation of the patient, contaminated with the poisonous nitrogenous output of the lung.

With this apparatus, rebreathing is impossible. It remains to show the result of the use of this or any other device which will enable us to deliver to the patient pure, unadulterated ether vapor, mixed in the proper proportions with pure air.

Referring to the cases in which this method has been used, the results are as follows: The induction of the anesthesia is practically without excitement or struggle; secretions from the mouth are practically *nil;* a normal color is maintained throughout the operation; the patient wakes up very shortly after returning to bed, and nausea and vomiting do not exist in more than 7 per cent. In only one case has there been nausea extending over an hour, where the operation was not that of gastro-enterostomy, or abdominal work accompanied with much intestinal irritation. This was a case operated upon for appendicitis last week. She gives a history of becoming nauseated whenever she endures any form of pain. Her headaches are all sick headaches. Therefore, to causes other than the anesthetic, the nausea following the operation may be attributed.

By this method the amount of ether required is about 40 per cent. of that by the drop method, even when the drop method is used by an expert.

The method had its birth with some extensive experiments in dog surgery. Being handicapped by not having an anesthetist to keep my dog asleep, I found a substitute necessary, and constructed a device which worked, but was a makeshift. In this first apparatus the exhalation went out through the source of supply, that is, the evaporating chamber, and into the room, wasting much ether. A Y-shaped intubation tube with air valves, similar to those on this apparatus, with a regulating device to admit more or less free air, kept the dog anesthetized for three or four hours without further attention to the anesthetic. This proved so satisfactory that it was used by Dr. Axel Werelius, of the South Shore Hospital, Chicago, who was the first surgeon to permit this apparatus to be used in his work. After repeated failures in completely anesthetizing the patient, a large evaporating chamber was used, and results most promising were accomplished. It was next used at the Cook County Hospital, by Dr. Lawrence Ryan, in a few of the alcoholics, with good results. This was about the time of the beginning of the war, and, feeling that the war zone presented a large field for anesthetics, I went to Belgium with the German Army, and gave thousands of anesthetics to wounded soldiers. The finer qualities of the apparatus and the method were added when use with this vast material proved their value.

TO READERS OF THE SUPPLEMENT

¶ While the pages of the Supplement are replete with invaluable suggestions for advancing the science of anesthesia and analgesia, the advertising sections of the American Journal of Surgery contain many valuable pointers regarding apparatus, drugs, agents, and accessories that fulfill many of the requirements in the practice of these specialties.

It will be of interest then to the readers of the Supplement to refer to these advertising sections for anything they may need in the practice of their specialty.

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* Read before the Mississippi Valley Medical Association, Lexington, Ky., October 19-21, 1915.

Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

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TUBAL AND OVARIAN INFECTION.

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From the Clinic of the Joseph Price Hospital.

I discuss this subject under the one head, as I feel the two lesions are, from a surgical standpoint, inseparable.

I always treat inflammatory lesions of the tubes and ovaries as a pathological entity. For a classical discussion of the subject, from salpingitis to pyosalpinx, or from ovaritis to ovarian abscess, I advise the reader to consult any modern text book. For any author in America to discuss inflammatory suppurative lesions of the uterine appendages without generous references to the work of Dr. Joseph Price, is to display unfamiliarity with the subject. It can be said, without possibility of denial, in my opinion, that the late Joseph Price had no peer as a surgeon in dealing with tubal and ovarian suppuration. I have seen a great number of cases which were entirely inoperable in the hands of excellent surgeons, cases which had been abandoned in operative procedure, which were completed with great ease and dispatch by Dr. Price, even though the operation was infinitely more difficult as a secondary one.

I make this reference to his great skill in this line of work, because it will later bring up a difference of opinion concerning removal or treatment of tubal and ovarian suppuration; one operator advocating radical removal of pyosalpinx and ovarian abscess, others dealing less radically with them, not so much on account of any good surgical reason, but possibly on account of the difficult surgery involved in the more radical procedure. What I say about pyosalpinx will also relate to ovarian abscess.

Regarding the etiology of pyosalpinx, it has been my experience in 95 per cent. of the patients upon whom I have operated that there had been some previous history with possible gonorrheal infection. I could not confirm such statement by microscopical examination, even though an exhaustive study had been made of each case, as by the time the patient presented herself for operation, it would have been impossible to find the specific germ. I have come to such conclusion from a clinical study of these patients and have based my observation on a definite previous history of yellow discharge, dysuria, frequency of urination and probability of infection. One may not be able to get such history previous to operation, but if one will carefully requestion the patient after operation and ask her when she had such symptoms, and not whether or not she had them, he will invariably elicit such a history. Then again, the nature of the pathology revealed at the time of operation, is diagnostic as to its etiology.

There is no infection which so uniformly leads to the big classical pyosalpinx, as gonorrheal infection. This is conversely confirmed by a familiarity with tubal disease of other known origins, such as the puerperal infection, which has little tendency to tubal occlusion, with formation of the classical tubal abscess. The symptomatology of pyosalpinx is most difficult to teach, as there is little consistency in its signs or symptoms. In the early stages of salpingitis of gonorrheal origin there is, as a rule, a clear history of pelvis pain, and great tenderness upon palpation of the vaginal fornix or the lower abdominal wall. Tenderness in the hypogastric region means some extension of infection or beginning peritonitis and is a little later in occurrence than the vaginal tenderness.

In nearly all cases of gonorrheal infection, there is a history of yellow discharge, sufficient to stain the clothes of the patient, an irritating dysuria, frequency of urination, swelling and tenderness of the vaginal and labial tissues. The swelling and tenderness of the vaginal tissue is, as a rule, of short duration, as the histology of the vaginal mucous membrane is such as not to harbor infection for any great length of time, so this condition cannot be treated as a vaginitis, with the idea that applications of antiseptics to the mucous membrane of the vagina will be of much benefit The discharge is kept up by and through the infection of the urethra and the cervical mucous membrane, whose histology is more favorable to deep infection, so that the prolonged gonorrheal discharge is not, in a sense, from a vaginitis and should not be treated as such. In women the urethra is shorter and of greater diameter than in men and, therefore, better drained; but the infection is often of chronic duration and of great virulence. It is my opinion that the cervix is often a nidus of gonorrheal infection and when this is ingrafted upon an old erosion, there is a chronically infected surface of extreme tenderness and a source of danger of further infection and also a means of exciting an acute exacerbation of the old trouble through any extra traumatic cause; therefore, in vaginal infection of gonorrheal origin, let us not think of the condition as a virulent vaginitis but direct our attention toward the prevention of the uretheral and cervical infection, anticipating the later resultant cystitis or tubal and ovarian infection. The vaginal discharge is of little pathological importance from a surgical standpoint other than as an occasional infection of Bartholin's glands with resultant abscess.

In regard to the prophylactic treatment of salpingitis or pyosalpinx of gonorrheal origin, I do not know of how much real service we render through local treatment of a specific vaginitis, urethritis or cervicitis; I have never had much confidence in local antiseptic and germicidal remedies in any of these conditions. I have always felt that the trauma incident to their application, on account of the inaccessibility of the true source of infection, was a means of further infecting the patient; however, other observers reported some supposed good results from local applications to the urethra and cervix. If there is any such thing as a prophylactic treatment of tubal and ovarian infection, I believe the best results can be obtained by putting the patient in bed on a light diet with frequent purgation.

Prolonged douches of hot astringent antiseptics may be of benefit, if they are carefully given, the patient being in the recumbent position. Great care must be used in the douche in order to prevent all trauma. All sexual excitement must be prevented. I feel that the usefulness of local applications in these cases is so very limited, that I have absolutely no office treatment along these lines. It matters not what the treatment may be, a very large per cent. of gonorrheal infections goes on to tubal and ovarian complication. It is with the surgery of this tubal and ovarian infection that I want to deal.

I am frequently asked if I believe that all cases of early gonorrheal infection of the tubes are surgical. In a broad sense they are. A certain per cent. of these cases of salpingitis may early become quiescent and may not give the patient annoyance until later years.

If the salpingitis has been of sufficient virulence to cause occlusion of the fimbriated extremity of the tube, I question whether these patients are ever free from the probable need of surgery. It must be borne in mind that gonorrheal infection is a destructive inflammation of the mucous membranes with a tendency to burrow deeply into this structure. I have always felt that if the infection from the gonococcus were as destructive to serous as to mucous membranes, we would lose a large per cent. of our cases of gonorrheal salpingitis from a diffuse peritonitis and its complications.

Fortunately, as this infection reaches the fimbriated extremity of the Fallopian tube and begins to infect or irritate its endothelial or peritoneal covering at its extremity, the reaction of the peritoneum is such as to occlude and limit the infection to the confines of the tube with a resulting tubal abscess. In those cases in which the ovary is also destroyed and the condition is one of tubo-ovarian abscess, the infected tube has, as it were, grasped the ovary with its infected fimbriated extremity, resulting in infection and destruction of the ovary. The ovary thus held in bondage, in the grasp of the infected tube, evidently soon loses its peritoneal covering from the destructive inflammation and the organ is thus sacrificed.

I have noticed in those gonorrheal infections in which the tube became of gigantic size from distension with pus and was not in a sense grasping or directly related to the ovary, that the ovary was in many instances in a state of preservation; at least it had not been destroyed. I use the phrase "state of preservation" in a qualified sense, as it is my opinion that practically all such ovaries are infected and should be treated surgically as such.

I believe the manner of infecting the Fallopian tube is clear, or at least satisfying, in that we feel the infection extends from the uterus by process of continuity of mucous membrane into the tube. In regard to the manner of ovarian infection, from my observations, I feel that in a certain per cent. of cases the ovary becomes directly infected through its blood and lymph supply. I give as my reasons for such conclusion, the following surgical experiences:

I have operated upon a great number of patients from whom I have removed a large ovarian abscess, as big as an orange or grapefruit, and did not use a ligature. The ovarian abscess could be shelled out with great ease.

Its attachment or surgical neck through which its vessels came, seemed to be rotted off and the lumen of the vessels occluded. From the facts that the tubes seem to have no direct relation with this form of ovarian abscess and that it could be removed without ligature or hemorrhage, I came to the conclusion that its infection came by way of its circulation through its mesentery. Further, the ease with which this big ovarian abscess can be removed indicates that its source of infection is in a sense internal through its circulation, because if the infection had extended from the tube on to the peritoneal surface of the ovary, the adhesions would have been universal, making its removal a difficult one.

Again, the very nature of the abscess suggests internal infection from its circulation, as the destruction of the ovary is complete, as it would probably be from a deep-seated, internal infection. The thickening of the walls of this abscess probably come from a piling up of one layer of adventitious or inflammatory membrane upon the other, which are the products of different attacks of local peritonitis. On account of this frequent internal infection of the ovary I have felt it is necessary in dealing with gonorrheal salpingitis or pyosalpinx to anticipate that the ovary is already infected and deal with it accordingly. My surgical experience with a great number of re-operations done on those patients who have had incomplete removal of the uterine appendages, forcibly bear me out in my opinion that tubal and ovarian infection must be treated as a pathological entity. This is entirely in accord with the teaching of Dr. Price, whose enormous experience in this subject makes most that he has said axiomatic. Every now and then some author comes forth with a paper advocating conservative treatment of infected tubes and ovaries and reports a pregnancy following a conservative operation on the uterine appendages. We all have seen this, but how many deaths have come from such incomplete work? How many of these patients who have had incomplete surgery on the uterine appendages, later develop almost impossible surgical procedures, the most difficult operations in abdominal surgery.

The diagnosis of tubal and ovarian infection of gonorrheal origin must be largely by palpation or physical signs.

It is most remarkable how very comfortable a patient may be and yet have an almost inoperable consolidation of her pelvic viscera. I have seen practically the lower half of the abdominal cavity, indeed, from the umbilicus to the coccyx, an incarcerated mass, yet the patient was fairly free from pain.

I believe that text-books in giving menorrhagia and metrorrhagia as a frequent symptom of tubal and ovarian infection, are to be questioned. I often find a normal menstrual life in even those exaggerated cases of tubal and ovarian infection. Fever is not often found except in the early stages of the condition, or later in the disease where there has been some acute exacerbation of an old condition. Pain upon locomotion is worthy of consideration. Most of the patients with tubal infection are careful in their movements; they avoid all jars and jolts; indeed their careful step and stooped position is often diagnostic as they enter the dispensary.

It is impossible to teach palpation upon paper. No operator has a right to do pelvic surgery unless he has had a long gynecological touch course. One of my assistants said, after making several thousand bimanual examinations in the old Philadelphia Dispensary, that he had not yet felt an ovary. So skill in pelvic examinations can be acquired only through prolonged training in a gynecological dispensary. It is almost impossible to convey to a reader's mind just what is meant by a mass in the lateral vaginal fornix, or what might be considered tenderness incident to tubal or ovarian infection. In a large per cent. of cases of tubal and ovarian fixation, a mass is easily palpated, but in a certain per cent. the tubes are fixed at a high level quite out of the pelvis, so that no mass is felt from vaginal palpation and little tenderness. There is some tenderness of the cervix, but the lateral mass incident to pus tubes, is more sensitive than the cervix; the reverse is so in extra-uterine pregnancy. I shall discuss this differential point at length when I take up extra-uterine pregnancy, as it is most worthy of consideration.

If one is familiar with the freedom of motion of the normal pelvic viscera, then fixation of the uterus and appendages is of extra value in the recognition of tubal and ovarian infection.

In taking up the surgical consideration of tubal and ovarian suppuration or any lesser degree of destruction of the uterine appendages, I believe the opinions of operators will differ in due proportion to their ability to deal surgically with the condition. The removal of the old suppurative condition of the tubes and ovaries from gonorrheal infection, is among the most difficult of all abdominal operations; therefore, one who has not had a long apprenticeship in pelvic surgery, or one who has not been taught the importance of radical removal of the fixed appendages, would be influenced toward the more conservative and less brilliant surgery and adopt vaginal puncture in a large number of cases. I am sure no one could have had an apprenticeship under Dr. Price and not have positive convictions regarding the necessity of radical removal from above of all suppurative lesions of the uterine appendages of gonorrheal origin. If conservative work has been practiced and vaginal puncture done in these conditions, secondary operation is infinitely more difficult, for each puncture is as a steel rivet nailing the pathology to the pelvic wall. If, as the vaginal puncture advocate claims, some patients are so acutely ill that they would not have stood radical operation from above, I have never seen such patients and my experience in this class of patients goes into the thousands. If a patient is too ill to stand a radical removal of the uterine appendages from above, I am quite sure vaginal puncture would not save her life. I base this assertion on this fact: if the patient is too ill to stand a section, her lesion is probably not a local condition which might be drained by vaginal puncture, but she is critically ill from a more diffuse peritonitis and possibly bowel obstruction, which would not be relieved by vaginal surgery, but strongly indicate abdominal work. I do not contend that there are not often local pelvic abscesses from which the patient has marked symptoms of pain and tenderness which may be relieved by vaginal puncture, but these are active symptoms and active symptoms do not occur in this condition in the dying patient. These patients will all stand radical removal. In my experience with pelvic suppuration, the fact stands out most conspicuously, that the very ill patient from tubal and ovarian suppuration of gonorrheal origin stands surgery with the greatest degree of resistance. The very nature of the pathology is such as to demand radical removal on account of its more or less local confines; further, its anatomical location is such as to favor enucleation or radical removal. We cannot apply such reasoning to the puerperal infections of the pelvic viscera, whose limitations of destructive pathology are not so well marked as those of gonorrheal variety. I shall discuss this more fully when I take up puerperal infections.

I never puncture the vaginal fornix for tubal or ovarian suppuration. Dr. Price termed it "a dismal swamp operation," and my experience has been such as to condemn it in unqualified terms. There has been a tendency in the last five years to deal with all infectious lesions of the abdominal cavity in a more conservative way. Much of the operative work has been little more than puncture or stab surgery. It may be claimed by its advocates, that this incomplete manner of dealing with suppurative lesions of the abdominal cavity is conservative work, but indeed it is the cause of most extravagant surgical procedures in the end. Primary convervatism always leads to multiple operations of the most difficult character. Many of the suppurative lesions of tubal or ovarian origin which could have been dealt with radically primarily with the greatest ease, are almost impossible for a master after vaginal puncture or any incomplete procedure from above. Indeed, much of the surgical work done today is not even sufficiently thorough for the operator to have made a diagnosis by or through his surgical procedure. I have had recently in my institution at one time three patients who had had the vaginal fornix punctured for supposed suppurative conditions of the uterine appendages, each patient having consulted me within a month of the time of vaginal puncture for ovarian malignancy. None of these patients ever had any inflammatory or infectious condition of their appendages, it was a clear error in diagnosis in each case, and, as I have said, the surgery was not sufficiently thorough to even make a diagnosis. Is it any wonder that we question the authenticity of statistics when it must be apparent that these three paitents are recorded in institutional records as cures of suppurative lesions of the uterine appendages when no such condition existed? This cannot be passed by lightly with the excuse that we all are so subject to human error (to which I plead guilty), but it is the teaching of the hour to be more conservative in all lesions which may be complicated by a peritonitis. I shall discuss this phase of the subject more freely when I take up peritonitis.

I do not believe there is any excuse at this date of privileged surgery for any operator to puncture the vaginal vault for gonorrheal infection. To simply drain away the fluid and leave that great conglomerate mass of infected tissue. is the most incomplete and inconsistent procedure that is possible at this enlightened age of surgery. Certainly an operator could not make a post-operative study of removed specimens of tubal and ovarian suppuration without being impressed with the feebleness of vaginal puncture.

After seeing the great number of strictures which exist in nearly all cases of gonorrheal pyosalpinx, it should be apparent to the operator that vaginal puncture would drain but one of the tubal abscesses which existed being adjacent strictures of the tube and possibly one-half dozen abscesses remained untouched. Again, the puncture may not even enter the tube at all, but drain an ovarian abscess, quite apart from the multiple tubal abscesses; or still again, the puncture may enter the pelvic cavity external to either tubal or ovarian abscess, and simply drain the periuterine area.

The intestine has been punctured per vaginam a good many times in an effort to drain the pelvis.

for tubal and ovarian suppuration. It is absolutely unnecessary as it is unsurgical to make an opening in the vaginal fornix, which is a fresh wound in an infected field fertile with absorbents. It will establish communication from a pus area above, through a fresh wound made in a lymphatic area, with an infected canal below. Every abdominal operation is a strong plea for that route in dealing with suppurative lesions of the uterine appendages. Each operation reveals many complications which would have remained undiscovered and untouched by vaginal puncture. It must be understood in all pus-forming conditions of the abdominal cavity, that it is not the lesion *per se* which is often the cause of the fatal termination, but the complications of such conditions.

This is especially true of gonorrheal pyosalpinx and ovarian abscess. I believe it can be said that very rarely is the local condition the cause of death, but it is the complicating peritonitis with resultant bowel obstruction, distal abscess, metastatic infections, etc., as a lesion *per se.*

I have never been able to see how any surgeon who was familiar with complications of tubal and ovarian suppuration could resort to vaginal puncture. He could not have, if he had for any length of time witnessed the work of Joseph Price in these conditions. This is another subject in which I feel licensed to indulge in a dogmatic expression and say it is not a question of difference in opinion, but one of difference of facts.

In discussing the subject of vaginal puncture for gonorrheal tubal and ovarian suppuration, I leave little room for the reader to misunderstand me.

We never do vaginal puncture in the Joseph Price Hospital for tubal and ovarian suppuration. In conclusion, our reasons are: first, it is a "dismal swamp" operation; it punctures one and leaves one-half dozen abscesses intact; it simply drains away the pus of a single abscess, leaving a great conglomerate mass of suppurating tissue; it makes a fresh wound, in a lymphatic area connecting a pus area above with an infected canal below—all unsurgical. Again, the patient is not particularly ill on account of the local pus condition accessible to puncture, but from the superimposed lesions—peritonitis, bowel obstruction, distal abscess, etc., which are entirely beyond the reach of vaginal puncture. Further, there is a possibility of wounding important viscera, as the operation is not sufficiently thorough to even make a diagnosis of the real condition: instances of which I have seen in great numbers.

There are probably very few instances in which a vaginal puncture has saved life. If the condition was sufficiently local to have been relieved by vaginal puncture, the patient would in all probability have gotten over the acute local condition by simply resting in bed. Further, if the patient is as ill as the vaginal puncture advocate claims, the chance is that she is suffering from the complications of the tubal and ovarian suppuration which will not be relieved by vaginal puncture. Now, if you please, view this important subject from above and the mist clears away; it is then you become intelligent as to the real nature of the pathology in every particular, of the honeycombed mass of diseased viscera which may extend from the umbilicus to the coccyx. I question at this date whether many of those gentlemen who do me the honor to read my discussion of this subject will agree with me; but permit me to make this assertion, that all will agree with the views of the late Joseph Price after a decade or so. It is already my experience that many patients who have had puncture surgery performed upon them are coming to me for complete surgery for pus-forming lesions of the abdominal cavity.

I always exhaust all my resources to make an accurate diagnosis of the infecting source before I open the abdomen; but after the abdomen is opened, I then forget or pay little attention to the primary source of trouble and deal with any pathological condition which presents itself.

One must learn a methodical and systematic method in all surgical procedures. Do not dive or delve headlong through pathological membranes or inflammatory barriers to seek the primary or distal infecting source, but surgically content yourself with any abnormality or pathological product which first presents itself. Remember, in the neglected suppurative conditions of tubes and ovaries, we are often dealing with terraced or stratified pathology which may begin above the umbilicus and end with the coccyx. Also, remember that the lesions which are superincumbent upon the suppurative mass below the ileopectineal line are probably of more importance and have more bearing on the patient's condition than the primary trouble.

In other words, suppurative lesions of the uterine appendages can seldom be surgically treated as lesions *per se.* All of these reasons are the very strongest arguments for abdominal surgery, as opposed to vaginal puncture.

Thorough abdominal surgery for all pus-forming lesions in which the ever-embarrassing and endangering adhesions are to be dealt with, cannot be done with the gloved hand; and it is my opinion that the rubber glove has much to do with the incomplete or puncture surgery of the day. The rubber glove has so increased the trauma incident to peritoniteal surgery, that many operators have abandoned complete procedures for the less radical and always to be condemned make-shift operations. One cannot deal with these universally adherent conditions by placing the patient in the Trendelenburg position and then attempting to use the scissors and knife under the direction of the eye. I regret that those who are interested in this subject could not have seen the greatest of all masters of this work, the late Joseph Price. Even by his numerous enemies he was the recognized master of the field. His ability to deal with adhesions and enucleate fixed and suppurative specimens was superb to the superlative degree.

I ask the patience of the reader who may not have known or loved Price as I did, to permit me to stamp his name indelibly upon this class of work, for no man living or dead was more its master. If this is so, what were his methods in the conduct of such cases?

Permit me to take as an example one of those exaggerated cases of gonorrheal tubal and ovarian suppuration in which the pathological condition begins at the umbilicus and extends to the coccyx.

The patient we are about to operate upon is forty-five years old; she has been an invalid for years and probably contracted her initial Neisserean infection twenty years ago, which is often the history of these exaggerated conditions. There is nothing diagnostic about her menstrual life, which also is often the case. This patient has had for years periods of different lengths of time in which she has been bedridden with pain, which I believe in her case was due to local attacks of peritonitis, incident to some traumatic influence which caused an acute extension from the old infecting source. This is the usual history of such cases, yet in some there is no history of sufficient pain to put the patient to bed. This patient told us she was very careful about going downstairs, she avoided all jars; in other words, she had pain upon locomotion. Her blood count tells us little. If she had presented herself at the apex of one of her acute attacks of local peritonitis, she would probably have shown an increase in the white cells. We do not permit the blood count to influence our work.

The patient is pale, she is not assimilating, she is not a good surgical risk; yet it is astonishing the powers of convalescence such patients have if the cause of destruction is removed. These patients go on for years with such history until they are incapacitated and then generally enter the hospital on account of some acute attack of local peritonitis.

Upon vaginal examination we find this patient's pelvis solid, all structures are agglutinated; I call it "a frozen pelvis." She is solid from her umbilicus down; indeed, many of these patients come to me with the diagnosis of fibroid tumor on account of extreme resistance due to this exaggerated suppurative condition of the uterine appendages and the superincumbent and fixed abdominal viscera. The entire lower half of the abdominal walls is not participating in respiration; so she has not only suffered from faulty metabolism due to blood dyscrasia, but she is not able to exercise her full respiratory function. It has been explained to this patient's husband the dangers and magnitude of the operation. She has already been made aware of her extreme condition by other operators, who have pronounced her inoperable. This operation from a physical standpoint will be nothing short of a prize-fight to both patient and operator.

I make my incision higher than for the average section for removal of diseased uterine appendages, otherwise I would enter, not the free abdominal cavity, but this huge inflammatory and suppurating mass.

Again, it is necessary to enter the abdominal cavity at a high point on account of possible injury of the bladder. In all large uterine and ovarian tumors and in extensive suppurative conditions of the uterine appendages, the bladder is often pulled up in front and is predisposed to incisional injury.

I now begin to deal systematically with this stratified or terraced mountain of pathology. I speak of it as a terraced mass, as I shall deal with the conditions by removing one layer at a time. The first anatomical structure with which my fingers come in contact is the fixed omentum. I shall attempt to release it by making gentle traction on it with my right hand, while I release its point of fixation by insinuating the index and middle fingers of the left hand around and below its fixed point. One must never attempt to dislodge or break the adhesions of any fixed viscus by traction. Traction on the mesentery is a most potent factor in the causation of shock and must be most studiously avoided in these burdened patients. Indeed, it is my opinion that many operators have abandoned complete or radical procedures on account of the shock they have occasioned through their manner of handling viscera; so I simply make sufficient traction on the omentum to define its fixed point and release it as described above.

I have now released the omentum and one can see that its point of fixation is gangrenous; it has sacrificed this portion in order to protect the general abdominal cavity. I shall next deal with the gangrenous portion of the omentum by amputating the destroyed portion. With a number two (2) silk ligature I transfix the center of the omentum well above the gangrenous portion and then tie both ways. This anchored ligature has no tendency to slip over the stump, which is likely to occur if one simply throws the ligature around the portion of tissue to be removed. I now infold the incised end of the omentum by a 00 silk ligature to prevent future adhesions. You see I meet the conditions as I come to them! never pass over a condition with the idea of returning to remedy it; you may later overlook some important point which is in need of attention.

I now proceed with the next layer of "terraced pathology," which happens to be, in this case, a portion of the ileum, I know not which portion and care not; it is enough to know that it is a part of the pathological condition, so I proceed to deliver the first portion of the small bowel with which my fingers come in contact. I proceed with the delivery of the ileum in the same manner as I did with the omentum. I make very gentle traction on any portion of the bowel I can deliver and then follow it through its continuity of structure until I reach its fixed point and then attempt to lift it from its adherent position with my left index and middle fingers. You see with what difficulty I release the fixed bowel and how impossible it would be to do this by traction.

I have been hard at work for some minutes and have not as yet gotten even in proximity of the ileopectineal line. I have at last gotten this piece of small bowel loose from its fixed point and, as I anticipated, it will need repair of an extensive laceration of its serous coat.

It is astonishing how one can encroach upon the lumen of the bowel without causing obstruction. I have a great number of times reduced the lumen to one-third its normal caliber without any future trouble. Try to avoid resections of the bowel in these suppurative conditions. I have placed hundreds of repair sutures in what seemed to be very questionable bowel, with no bad results. You will often be astonished at the recuperative powers of the infected bowel, if all bowel obstructions are relieved and systematic repair done. You will not get good results in repair of damaged bowel in a superlative degree unless all adhesions are broken and incomplete bowel obstructions due to fixed points are relieved. The distension proximal to such partial bowel obstruction will produce sufficient tension on the repaired bowel to interfere with union of the lacerated areas and predispose to fistula, peritonitis, etc.

At short intervals the nurse pours hot saline solution over the small bowel which I have been repairing, and the eviscerated organs are kept under hot towels, in order to prevent shock and collapse; however, do not hamper yourself through an attempt to cover up viscera with towels which may get much in your way while dealing with the bowel. Remember, in these patients with extensive adhesions, there is much to do and it is essential to use all dispatch. Dr. Price was in the habit of saying, "Stick to your surgery, but do not let your surgery stick to you," by which he meant, do thorough work, but get through.

I have now released all the small bowel which constituted the second layer of the mass; let us proceed with the third layer. In my attempt to get into the true pelvis with my index and middle fingers, I find I am blocked at every point; there seems to be a complete roof over the pelvis viscera. Remember, in a true sense, there is no such thing as an inflammatory barrier and that this supposed barrier is composed of viscera of vital importance, so we cannot blast our way through. Of what is this impenetrable roof most apt to be composed? In a very large per cent. of these neglected cases, the big redundant sigmoid throws itself over the inflamed tissues in its attempt to isolate them from the general abdominal cavity; or one may find the sigmoid and cecum adherent together behind and above the suppurating uterine appendages. Dr. Price was in the habit of saying, "I find the sigmoid and cecum horse-shoed posterior to the pelvic mass." It is astonishing to what tremendous proportions the sigmoid becomes in its effort to encircle or cofferdam the pelvic disease. I have seen this great redundant sigmoid with walls so thick that it was impossible to distinguish it from the thick walls of the uterus. Indeed, it so outgrows itself that it is almost impossible to recognize its entity.

In an attempt to enucleate or deliver the long-fixed uterine appendages, remember, it is the sigmoid which is in the greatest danger of injury.

The rectum must also be kept in mind. I have seen great holes admitting four fingers torn in the sigmoid, in the operator's effort to remove fixed appendages. The operator did not view the pathological condition as one of a terraced mass, and had thus not proceeded to reach the pelvis by removing the pathological structures in layers, but had passed his hand from above entirely through the redundant sigmoid; this might happen to the most careful operator, as these conditions are next to inoperable. This mass which seems to form an impenetrable partition between the pelvic and abdominal cavities, I take to be in this case, the redundant and much thickened sigmoid of which I have been speaking.

I am now making an extreme effort to find a point of cleavage which may lead into the pelvis, and I am making this effort well over toward the right side in order that I may keep as far from the sigmoid as possible. The cecum is not as apt to be in the pelvis as the sigmoid; so I am not as prone to injure it by my attempt to enter the pelvis on the right side.

I have not as yet found any point through which I can make any impression on this barrier. I was making a like discussion in one of these difficult cases when a friendly physician said, "Do not believe him; he has gotten that mass all ready to deliver and will have it out in a second." The only comment I could make to my friend was, "If you are attempting to be spectacular in your surgery, do not choose the 'frozen pelvis'."

I have at last succeeded in finding a point of cleavage well over on the right side and I take it for granted that my two fingers are passing down between the head of the cecum and a huge sigmoid; so in this particular case, we have the sigmoid and cecum united or horse-shoed behind and above the pelvic mass.

I have not as yet touched or in any way recogognized the uterus or its appendages; I have had enough to do. Think again, if you please, of vaginal puncture for this case. I do not mean to be disagreeable, but it is these patients who convey the proper mental picture of our duty.

I have now pretty well succeeded in enucleating and releasing the sigmoid and cecum from each other and from the underlying tissues. Note now the great redundant and much-thickened sigmoid. We could scarcely recognize it as a portion of the big bowel; its walls are one-half an inch thick and it looks as though it would never return to its normal outline, position and function, but it will. I shall refer to this helpless-looking sigmoid again when I speak of drainage.

I shall now proceed to repair any injuries of the cecum or sigmoid which I have occasioned. I find the cecum in very good condition, as might be expected, as it has not participated in defending the general abdominal cavity to the same extent as the sigmoid. We find several injuries to the sigmoid, which I now repair. If you learn to tie with a needle in your hand, you save much valuable time. I have illustrated this method of suturing and tying in other publications.

I am using the ordinary cambric sewing needle of the smallest size, which will admit the 00 Chinese twist silk. Do not permit the use of silk in the abdominal cavity to worry you. There has been no catgut or absorbable ligature used in this hospital for about a quarter of a century.

I have now finished with the third layer of the terraced pathological mass and I have not yet reached the primary infecting lesion, nor have I tried directly to exhume the buried uterine appendages.

I am now proceeding to deliver the fourth layer of pathological structures, which in this case is supposed to be the suppurating uterine appendages; so I begin again to find a point of cleavage, a seam or crevice which will permit me to enter the true pelvis. All work up to this time has been done above the ileopectineal line. As a rule, I begin my effort to find some point of cleavage between the adherent pelvic viscera just back of the fundus of the uterus. If I am not able to enter at this point, I next try well over to the right side, for the same reason I gave while discussing possible injury to sigmoid or rectum. The cecum being less apt to be in the pelvis, complicating the condition, the pelvis as a rule is more empty on the right side and gives a more accessible point for entrance. In this particular case after strenuous efforts, as you see, I am able to find the point of cleavage back of the fundus of the uterus, which is often hard to recognize, and was so in this case.

I have at last entered this point of cleavage to the full extent of my middle and index fingers, and the pus and blood which flows from the incision and floods the abdominal wall show that I have ruptured the suppurating pelvic mass. I make no effort to wash or sponge away the great quantity of pus or blood which is covering the lower one-half of the abdominal wall, but keep on in my efforts of enucleation.

When you have found a point of cleavage leading into the pelvis, stay there; do not dance around and seek other points, but follow out the line of cleavage, insinuating your fingers between the pelvic viscera along the lines of least resistance. I find in this case, my line of cleavage leads from the fundus of the uterus in front directly posteriorly between two lateral masses, which I take to be the right and left uterine appendages; so in this case I have not as yet ruptured either right or left tubo-ovarian abscess; therefore, the great amount of pus seen so far has come from the true pelvis and is external to the tubal and ovarian abscesses; so if I had made a vaginal puncture and entered the pelvis from below at the same point I have entered from above (and this is where my puncture would have been), you see I would still be external with my drainage to the tubal and ovarian abscesses.

I must say even more than this against vaginal puncture in this case. This great amount of pus seen welling up and which has not come from either tubal or ovarian abscess, is not accessible to puncture drainage from either above or below; I have used great strength in breaking up the partitions and trabeculae which ramified the abscess and divided it into many compartments converting the pelvic mass into a honeycombed arrangement. The drainage of any one compartment would be of no avail to the numerous others; indeed, I have often seen just this condition of affairs follow vaginal puncture.

I am now making an effort to deliver the right specimen. I have been able to pretty well enucleate the mass, but I find that at a certain point deep down in the pelvis, it seems to be nailed to the pelvic floor. This fixed point is probably the location of the fimbriated extremity of the tube and the probable location of the very earliest site of adhesions which were the cause of the tubal occlusion.

With my right hand I make slight traction on the right tube at its uterine extremity and then I follow along the tube (whose location has been made more definite by slight retraction) with my index and middle finger of the left hand until I reach its most dependent point in the pelvis, and attempt to lift the tube from its fixed point by insinuating my two fingers beneath it. This fixed point of the fimbriated extremity of the tube is not unusual, and many operators who do not follow the tube to its distal fixed location, break the tube well above its fixation, leaving a good portion in the pelvis.

Now notice that since I have delivered the right specimen, there is no direct connection between the tube and ovary and also that, in a sense, the ovary is not participating in the destructive process; the ovary, however, is infected and I remove it with the tube. I accept it that this brings out with great emphasis a contention I made in my earlier remarks regarding the manner of infection of the ovary. Had I found the tube grasping the ovary or intimately associated with it, we would then have had a destruction of the organ with a formation of a tubo-ovarian abscess; but in this case, as I explained in delivering the tube from its fixed point at the bottom of the pelvis, there had been no direct connection between the tube and ovary, thus we find the ovary in a fair state of preservation, even though it may be infected.

I shall now proceed to remove this right specimen which I have delivered well above the incision. Had the uterus been retroverted it would have been necessary for me to have broken up the adhesions of the left side before I would have been able to deliver the specimen on the right side. This is often necessary before we can deal with thorough removal of the suppurating appendages.

In order that I may remove all of this infected tube, I make two small incisions in the cornua of the uterus, one on either side of the tube; I thus remove every cell of the tube and then close the small area in the cornua of the uterus with No. I silk. I make a transfixion through the center of the pedicle of the specimen with the oöphorectomy ligature-holder, which is threaded with No. 4 silk; as I withdraw it, it leaves a double ligature. I now pick up the two ends of either ligature and make a slight traction, and then pick up one end of the other ligature and make a traction upon it. If this ligature slips or slides through its point of fixation without producing friction on the other ligature upon which I am making slight traction, then the two ligatures are separate and do not form a figure eight (8), and one might get some hemorrhage from vessels not included in the tie. If you do not feel the friction you should if the ligatures were entwined, simply toss one end of the ligature between the two ends you are holding or making traction upon; this always produces the figure eight and permits no untied tissue. I have continued to use this method of tying which was used by the older operators, because, with this method I have never seen an abdominal hemorrhage. Dr. Price used this method exclusively.

I now tie off the uterine end of the specimen and the ligature slips off the cornua of the uterus from which I have incised the end of the tube and passes beneath the incised end of the tube which my assistant holds up, in order that I may tie below. I place a surgical knot in the ligature and then in my tie I permit my two thumbs, with which I make tension on the ligature, to pass the point of tie in order that the convexity of the tie is toward me. By so doing I lessen the friction in the surgical knot and thus get a tighter tie.

I now pick up the other ligature and make the tie of the outer or external half of the pedicle, which probably contains the ovarian artery. Before I sever the tube and ovary I repair the cornua of the uterus, as the specimen gives me a good handle to make traction upon and thus hold the small area to be repaired, well up into the incision. In amputating the specimen, you must cut the pedicle cone-shape; remember, the pedicle retracts from its center and not the bite of the ligature. In surgery we must constantly have in mind the mechanics of the operation, but never permit mechanics to interfere with the mental picture of the pathological condition.

I have now closed the small area in the cornua of the uterus which remained from complete amputation of the tube. In a considerable number of cases of tubal infection, there exists an isolated abscess in the uterine end of the tube, and if the tie in removal of the tube is distal to such abscess, it may be neecessary at a late date to operate for such condition as a secondary abscess. It is nearly always a fertile source for adhesions and is the infecting source for a dead ligature. Indeed, it is not the quality of the ligature which is so often the cause of an infected or dead ligature, but it is the remaining pathology which is the source of infecting the ligature which has been placed in an infected area. If this were not so, I am sure we could not use silk exclusively in all the pus work we do without trouble from it; and if we were getting dead ligatures with resulting fistula, I am even more sure we would have given up the use of silk years ago.

I now proceed to deliver the left tube and ovary. I have already enucleated or elevated the big sigmoid which had formed a roof over the specimen. I again seek a point of cleavage between the posterior aspect of the uterus, the broad ligament and the specimen, and I deliver the left side, just as I did the right, by keeping my enucleating fingers in line of cleavage, following up any advantage I may have gained in an effort to enucleate or deliver the infected mass. As I said before, one must exercise the greatest care when dealing with the left specimen in order to prevent injury to either sigmoid or rectum.

As I partially deliver this specimen, there are a few adhesions between the sigmoid and specimen which I have not broken. I break these adhesions by pressure with the palmar aspect of my fingers. Learn to use the palmar aspect of your fingers in breaking adhesions. Never upset your hand. Work with the palmar aspect upward. I have never seen Dr. Price introduce more than two fingers into the abdomen in my life. The introduction of the entire hand and forearm, which is so often seen today, means that the operator has not made a diagnosis before the operation: indeed, there are very few operations in which the incision should be sufficiently large to admit the hand.

Earlier I called attention to the fact that I was paying no attention to the admixture of pus and blood as it flowed from the incision and obscured the field of work. To attempt to sponge away this discharge would entail a loss of time and avail nothing. As I said before, this work must be done entirely from sense of touch; therefore, any attempt to clear the field of operation is not only a loss of valuable time, but when one withdraws the enucleating fingers from the line of cleavage already made, he not only loses the site of enucleation but increases the hemorrhage by withdrawal of his fingers.

Now I have pretty well delivered this left tube and ovary above the incision; quite a different picture of pathology from that of the right tube and ovary presents itself. In this specimen the tube and ovary are an indistinguishable mass; the tube, as it were, grasps the ovary and is in such intimate relation to it we can scarcely see a line of demarkation between what was the fimbriated extremity of the tube and the ovary. The ovary is entirely destroyed and probably in this case forms a continuous abscess with that of the tube; it is truly a tubo-ovarian abscess. This is what we should expect in this form of tubo-ovarian abscess, in which the infected tube early grasped the ovary as the ovary came to the rescue of the general abdominal cavity in its effort to prevent a more general peritonitis and was thus sacrificed by an overwhelming dose of infection through its peritoneal surface.

Although this specimen was on the left side, the danger side on account of the sigmoid and the side on which adhesions are most often numerous and hard to break, I had less difficulty in delivering this specimen than I had on the right side. I give as my reasons for this condition the assumption that in the very early history of the tubo-ovarian abscess of the left side, the infection was effectually blocked by the intimate adhesions between the tube and ovary which this specimen shows, and therefore we did not have to deal with extensive adhesions, which would have occurred from a leaking tube, with resulting attacks of local peritonitis.

I also want to call attention to another interesting fact in the pathology of this specimen. Although this ovary is entirely destroyed, I was not able to shell or peel the ovary from its surroundings and cast it off as a separate and distinct abscess without hemorrhage or need of ligature, as I probably could have done if the overwhelming dose of infection had come by the way of the bloodvessels through its surgical neck.

I will now remove this specimen by the same steps I executed on the right side. I cut a V-shaped section out of the fundus of the uterus in order that I may remove the entire infected tube, then close the space by a few simple Lembert No. I silk sutures. We always do stumpless surgery; it is the remaining one-tenth or one-twentieth of the pathological specimen which produces the dead ligature and not the nature of the ligature.

The attempt to place the acute pus-forming lesions on the waiting list in order to secure the quiescent stage for operative measures and the incomplete surgery from above and vaginal puncture from below, will result in just what we have here encountered.

It remains for me to cleanse the field of operation and then take up the matter of drainage in these cases.

As I released the viscera and then repaired them seriatim, I also flushed the viscera with hot saline solution of a temperature of 115° to 120°. In my attempt to finally deliver the pelvic specimen I, of course, spread some contamination from free pus to the adjacent viscera, but I will not re-eviscerate for purpose of cleansing such organs, for this reason: the pus in these very old conditions is not of extreme infectious nature; many authors claim it is quite sterile; I do not like the statement, however; again, I expect to extensively drain this patient with the Price cofferdam, so I do not intend to make more than a local toilet of the pelvis.

I use the Price irrigator, a simple affair; it consists of an ordinary funnel, eighteen inches of rubber tube and a hard rubber nozzle ten inches long with a flushing diameter of one-half inch. The lower two-thirds of the nozzle is obliquely perforated by numerous openings one-eighth of an inch in diameter. These oblique perforations of the tube are of such an angle as to direct the flow in an upward direction; the caliber of the tube is of sufficient size to permit considerable force, so that all clots and débris are washed from the bottom of the pelvis.

We are now ready to irrigate the pelvis. I pass my left index and middle fingers into the pelvis and first withdraw the viscera therefrom and hold them above the ileopectineal line with my two fingers and then introduce the irrigator to the bottom of the pelvis. My two fingers which, controlling the viscera, have made with the irrigator a trivalved speculum, so to speak, which gives an open space for the water and debris to come from the pelvis with a gush. The big blood clots and inflammatory débris are thrown from the pelvis with considerable force. One can more quickly and thoroughly make a toilet by flushing than by excessive sponging. It is done with much less degree of trauma and then the hot solution is not only hemostatic but a very powerful stimulant, which these patients much need after such trying procedure.

I have perfect control of the viscera with my two fingers and the back of my left hand. The intestine does not protrude from the incision as it would had I not complete control of the viscera.

I now introduce a gauze towel to remove some of the excess saline solution remaining in the pelvis. With the long dressing forcep I slide the towel over the palmar aspects of my two fingers, which are still controlling the viscera and keeping them from collapsing into the pelvis. I do not only quickly and easily pass the towel into the pelvis, but my fingers protect the viscera from the trauma incident to such manipulation.

It is impossible to do these extreme operations without in every way possible reducing trauma to its minimum. There is a thousand times more danger in permitting one adhesion to remain as a potential possibility of bowel obstruction, than there is danger in the trauma incident to its proper release. This has been the great point of contention and it was the positive view of Dr. Price that all adhesions must be broken and the distal infecting source reached, which made him the greatest of all masters in this work. When I take up the toilet of general peritonitis, I shall have much to say about thorough and proper methods of irrigating the abdomen.

I expect to drain this patient with gauze and will insert the classical cofferdam. Dr. Price first used this system of extensive gauze drain in 1878 in the slums of Philadelphia. He had been sent by the Coroner to perform an autopsy on a woman who was supposed to be dead from a criminal abortion. When he arrived he found the patient still living, but in practically a moribund condition from a general peritonitis. He eviscerated and flushed the patient out with hot water and drained her with his system of extensive insertion of gauze, or material we used as gauze at that date. The patient lived. This incident probably had much to do with his future treatment of like cases.

I drain this patient for several reasons. Not so much on account of the pus that has flowed over the sides of the table, but for mechanical reasons.

I have amputated the gangrenous omentum; I have repaired the lacerated and infected ileum, which was twice its normal size, possibly from both hypertrophy and infiltration; I released the redundant and infected sigmoid which formed a roof over all the pelvic disease; I separated the cecum from the sigmoid which had become horse-shoed posterior to the uterus; and, at last, I dug the uterine appendages from their fixed position in the pelvis. In other words, I made a great excavation which had been filled with infected, infiltrated and half paralyzed viscera. It is the mechanical function of the cofferdam of gauze which is so valuable in preventing these infected and partially paralyzed organs from prolapsing into this infected well and later producing a post-operative bowel obstruction. It has also other mechanical functions; it not only prevents the viscera from prolapsing into the infected pelvis and later becoming adherent, with the production of post-operative bowel obstruction, but, by elevating the engorged and thrombotic viscera, it improves the circulation, encouraging the process of repair of such viscera. It has another important mechanical function: after such difficult enucleations there is considerable bleeding from hundreds of sources; the cofferdam is not only the best, but the only, method of preventing such oozing with the formation of blood clot in the midst of an infected area, with the probability of the formation of a pelvic abscess.

I believe that the simple glass or rubber tube has no place in these extensive suppurative conditions. If this patient had not had several lesions of the viscera, if the bowel had not been so big and redundant and I had simply to deal with adherent uterine appendages, even though there had been considerable pus, I would not have drained unless there had been much bleeding from the numerous pelvic adhesions; I would then have inserted a Koeberly glass tube as an index to the amount of oozing and a means by which I could have removed the blood in order to prevent infection of the clot.

The very strongest argument I can offer that this is the proper method of dealing with these extensive lesions is just this: in twelve years' experience with Dr. Price, who did so much of this work, and in my own experience, I have never seen an acute post-operative bowel obstruction!

I now insert the cofferdam. I again pass my left index and middle fingers into the pelvis, elevate the bowel from the true pelvis and retain it by my fingers, while I insert the cofferdam. The insertion of this extensive system of gauze drain should be a piece of perfect civil engineering.

I begin well over to the left side of the pelvis, below the big sigmoid, which I am keeping from prolapsing into the pelvis, and insert these pieces of gauze, which are twelve inches long, one and one-half inches wide, and folded until they are of eight thicknesses, and insert them one against the other by the aid of a long dressing forcep, until I have erected a solid cofferdam posterior to the uterus and broad ligament, entirely filling the pelvis.

Nothing has been so unfortunate as the substitution of tube drainage for gauze. You cannot surgically handle these extensively infected and suppurating conditions unless you are familiar with the system of cofferdam drainage. One of the reasons that gauze has largely been abandoned as a drain is, that operators have not taken into consideration the mechanics of the drainage and have not used it as a solid cofferdam, but have run strands of gauze as flying buttresses to supposed infected and dependent points in the abdominal cavity, and have by such indiscriminate insertion of the drainage, produced post-operative bowel obstruction from these guy ropes inserted promiscuously among the viscera. The cofferdam will not produce a bowel obstruction, for it was inserted as a solid wall damming off the pelvis and lower abdominal cavity with no room left for the viscera to get between the strands of gauze. I have never had any trouble from pressure on the rectum by the cofferdam; if you do have, you can obviate it by inserting a rectal tube and permitting it to remain some time.

Those operators who have had trouble from such pressure of gauze on the rectum, did not in reality have an obstruction of the rectum from the gauze drain, but the bowel obstruction came from the fact that the sigmoid was not held out of the pelvis during the insertion of the cofferdam and the obstruction came from pressure on this viscus.

Ordinarily I do not place any sutures in the abdominal wall in such cases, but I have made a very long incision in this patient in order that I could enter the abdominal cavity above the line of fixed viscera, which extended to the umbilicus; so I will insert two or three silkworm gut through-and-through sutures.

The cofferdam will not be touched for seven days. At the end of that time it will be removed and a small gauze drain inserted in the lower angle of the incision: the incision will then be strapped as tight as possible. At the end of forty-eight hours more the small drain is removed and the few sutures also taken out, the incision again strapped as tight as possible and no further drain is ever inserted.

After this patient reaches her room she will have a big, old-fashioned mustard plaster put over both lungs and the foot of the bed will be elevated eighteen inches; we never use the Fowler position. She will be surrounded by several hot soap stones and given saline solution in the bowel. To my knowledge there has never been an operative pneumonia in the history of the Joseph Price Hospital.

I have no solution for this almost unbelievable statement, other than the possible difference in the conduct of our operations. We give as little ether as possible and give it exclusively; we never use the Trendelenburg position in operating; we never use retractors whose trauma is a cause of shock; we always remove the distal infecting source in pus conditions, which may prevent metastasis to the lungs. In the very old, the very young, and in prolonged operations, we always cover the chest with a counter-irritant.

We are very careful in having the chest and entire patient protected before she left the operating room. I have always felt that the conduct of the patient to and from the operating room was a fertile source of chest conditions. The patient's bed should also be warm.

For a number of years we were in the habit of beginning to remove our cofferdams at the expiration of forty-eight hours; we found every now and then we had some bleeding following removal of part or all of the cofferdam; this would be followed by some secondary infection, manifested by fever, increase of pulse, etc. Also, it was more difficult to remove the drain at this early date, so we began to remove the drains on the third day, then fourth, fifth and sixth day; now we do not touch these big cofferdams until the seventh day; we then find that the drains come out more easily, and there is no after-bleeding or secondary infection incident to removal of the drain. The viscera by this time are well glazed over, their absorbants have been cofferdammed, so to speak, and there is practically no danger of secondary infection or post-operative bowel obstruction from the intestine coming in contact with the infected areas. The gauze by this time has established a good drainage canal and there is practically no danger of local collection of pus or formation of post-operative abscess. As we have not had post-operative bowel obstruction or post-operative abscesses, we feel our system of drainage is correct. While we have been in the habit of placing a small gauze drain after removal of the cofferdam, permitting it to remain for forty-eight hours in order to continue a local drainage at the lower angle of incision, I am now beginning to not even insert this small drain but strap the incision as tight as possible as soon as the cofferdam is removed. There is too much meddlesome work done to the drainage incision. After the cofferdam and the small secondary drain are removed, we never again enter the incision with any kind of drainage and never make any flush toilet of the wound; in other words, we never go below the level of the skin with drainage or toilet. This teaching also applies to those bad fecal fistulæ which may follow difficult pus work. All pus incisions and fecal fistulæ will heal in one-fourth the time if one will scientifically neglect the wound. Simply cleanse the skin about the wound with alcohol and touch occasionally with tincture of iodine and dress with sterile gauze as often as necessary. I have never known why it was that there is an inherent tendency for everyone to press or squeeze a boil or make local pressure near an abscess to increase the flow of pus. That loose pus or fecal matter in the wound which such meddlesome treatment may expel, is doing no harm, it is not under tension and is not being absorbed; but when you begin to make pressure by squeezing the parts you produce some fresh bleeding which is followed by absorption of pus, producing secondary infection.

I have had two and possibly three patients killed for me by meddlesome tampering with my drains and re-insertion of drains for weeks, against my instruction, after my cofferdam had been removed at an earlier date than I had advised.

In a number of instances I have seen men packing a fistulous opening in a bowel with gauze and then wondering why it did not close.

When you leave the wound, be sure you leave no disease behind; but after getting out, stay out. Practically all fistulous openings into the bowel (providing the pathology has been removed and all bowel obstructions distal to such fistulæ released) will close without treatment, unless you are dealing with tubercular peritonitis.

Why did I not remove the uterus? The uterus in this case was not enlarged, it was really undersized and did not contain any local abscesses. I removed a piece of each cornua of the uterus surrounding the tube, so that I have no point of possible infection from that source. It adds to the risk of these extensive suppurative conditions to open up fresh areas which would be done by hysterectomy; it would also prolong the operation and add to shock. If the uterus had been big, soft and infected, or contained intramural abscesses, or, if it had shown extensive infection in the cornua of the uterus, I should have done a hysterectomy.

Do I operate in all cases in the earliest stages of gonorrheal salpingitis? I do not always operate, because I have a horror of unsexing so many of these young women who are in no way to blame for this vicious infection. It would be good surgery to operate early on every case of gonorrheal salpingitis. I cannot agree with the general teaching that the mortality would be high if operations were done in the acute stages of gonorrheal salpingitis. If all cases were operated upon early and complete amputation of the diseased uterine appendages were done, the total mortality would be much lower than it is at the present day, when one is seeing a great number of horrible cases of neglect. The great difficulty of our profession in getting together as a unit on any particular subject is that we discuss the matter from different viewpoints.

The mortality would be much lower if early removal of all cases of gonorrheal salpingitis were done.

I am aware that anyone's mortality for any given number of cases would be lower were he to operate after the subsidence of acute symptoms, than it would be were he to operate in all acute spreading conditions; but who is going to give assurance that any particular case will become a quiescent one?

When speaking of mortality, these are the questions that must be answered, and which, I am ashamed to say, we as a profession do not answer, for the simple reason that we lack individual responsibility, present and future, for each and every case we see. In considering the mortality our actions should be controlled, not only by the immediate factors of danger in the operation, but also by the future mortality which hang over that case.

What is the primary operative mortality; what is the secondary mortality; what are the dangers of secondary conditions incident to waiting; what is the morbidity, etc.?

If the future of gonorrheal salpingitis were taken to determine its mortality, morbidity, complications and spread of infection, we would be a unit upon its uniform early removal. It is the unknown which divides us as operators.

Drainage is a very interesting subject to me and I have given it a great deal of thought. I am more convinced each day that it is not the extensive system of drainage which predisposes to adhesions, but it is the incomplete removal of lesions, the lack of thorough primary work (breaking of adhesions and proper toilet) which produces the harmful adhesions. I have re-opened these patients who have had a cofferdam inserted and have been gratified to find so few adhesions, possibly only a friable cobweb-like veil to the scar; or if there had been no hernia following the open treatment I have seen cases in which there was not a sign of adhesion. This is most astonishing when you consider that for fourteen years, 45 per cent. of the abdominal work done in this hospital has been re-operations and I have never opened but one case in which I did not find adhesions. I offer as my solution for this, buried catgut, the trauma of retractors, the rubber glove and incomplete work. The harmful adhesion is the long cord-like one which extends like a flying buttress from some point in the scar to a remaining portion of the primary pathological lesion and is a very fertile source of bowel obstruction. The thin, cobweb-like veil which may follow the cofferdam is not a potential source of bowel obstruction.

In those conditions where you have packed more to check hemorrhage than for pus or peritonitis the packing is followed by numerous adhesions; so the more nearly we get our drainage directly proportionate to the necessity of such drainage, the better the results in every particular.

BRAIN INJURIES.*

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Anatomical and physiological observations on the covering membranes and circulation of the central nervous system.

The dura is a dense membrane closely attached to the inner surface of the skull whose periosteum it forms. In childhood it plays an important part in development of the bone. It can be easily stripped from the greater portion of the vault of the cranium; at the base it is more densely attached to the bone and can, in certain locations, be removed with difficulty. Hence, in these locations, it is easily and frequently torn in fractures extending to the base. In children the dura is closely attached to the sutures, and in extra-dural hemorrhage during infancy the clot is usually confined to a single bone. The inner layer of the dura is prolonged at the exits of certain of the cranial nerves forming a sheath for them. This is noticeably true of the optic nerve, and becomes a factor in the production of choked disc in cases of compression.

The dura is composed of two layers. The outer layer, as previously mentioned, forms the periosteum of the bone; the inner layer is less dense in structure, is lined by endothelial cells, and affords a smooth covering for the more delicate arachnoid underneath it. At certain places the layers become separated, forming the venous sinuses of the brain.

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A reduplication of this inner layer forms the falx cerebri and the tentorium cerebelli. These structures are dense, more or less unyielding, and afford support and protection to corresponding portions of the brain. They are of practical importance in the study of compression, inasmuch as they tend to limit the brain pressure to the compartment in which the pathology exists; e. g., the tentorium being swung from the lower and posterior border of the falx gives support to the cerebral hemispheres and affords protection to the important structures lying in the subtentorial compartment when there is pronounced increase in intra-cranial pressure.

The space between the dura and the arachnoid is small in the cranial cavity, and normally contains but a few c.c. of cerebro-spinal fluid. In the spinal canal this space is practically obliterated. The pia and arachnoid are very delicate membranes. The pia fits closely to the brain substance and dips into the sulci. It carries the vessels to and from the cortex. The arachnoid fits more loosely and bridges the sulci from summit to summit of the convolutions. As Cushing has graphically described it, the pia fits like a glove, while the arachnoid is like a mitten pulled over the gloved hand.

The space between the pia and the arachnoid is known as the arachnoid or subarachnoid space. It is traversed by delicate bands of connective tissue. At the crest of the convolution the strands are short: in the sulci longer and more loosely arranged. The great bulk of the cerebro-spinal fluid is found in the connective tissue meshwork of this delicate membrane. Henle has described it as the "physiological water-seeking connective tissue." It is in this connective tissue network covering the cord that the fibrinous exudates accumulate in some cases of meningitis and give rise to dry puncture when attempts are made to withdraw the cerebro-spinal fluid.

At the base there are certain large subarachnoid spaces—cisternæ—in the peduncular region and around the pons and medulla. The subarachnoid space is continuous with that of the spinal canal. The dura of the spinal canal is not attached to the vertebræ but hangs as a long elastic tube capable of distension, and, as we shall see, acting as a great protection to the brain in cases of compression.

The arteries distributed to the cortex lie in the pia and at once branch into a fine capillary network. Branching at right angles they produce a rapid fall in blood pressure and slowing of the current, thus insuring good nutrition to the cortical cells. The gray matter is much more abundantly supplied with blood than the white. The arteries going to the cortex anastomose freely. The arteries going to the large basal ganglia, choroid plexus and adjacent structures, are all end arteries and collateral circulation is rarely observed. Each region has its own individual blood supply. The relative advantages and disadvantages of this arrangement are readily apparent. The arteries either have no vaso-motor nerves, or, if they do, the nerves perform a different function from that performed by the vaso-motor nerves of the general circulation. The intra-cranial blood pressure is regulated by gravity and the integrity of the vaso-motor center controlling the systemic circulation.

The veins are large with thin walls easily distended and easily compressed; they have no valves. Certain veins are terminal and softening may occur as readily from the blocking of terminal veins as of terminal arteries. Obstruction to the vein of Galen by thrombosis, as from pressure exerted by a tumor, compressing the vein or the sinus rectus, will cause an acute hydrocephalus with a bloody exudate into the ventricles. Certain trunk veins of the cortex, when obstructed, will cause cerebral softening. The veins of the cortex empty for the most part into the superior longitudinal sinus and against the blood stream. Extending laterally from the sinus proper for one-half to one inch on either side of the great longitudinal fissure are the parasinoidal sinuses or lacuna laterales. It is into these lateral expansions of the sinus that the veins empty. Into these lakes also are thrust the pacchionanian granulations. They are tuft-like processes from the arachnoid covered by delicate endothelium and contain cerebro-spinal fluid. This arrangement makes the attachment of the dura to the brain very close, and the membrane cannot be easily removed.

Injuries and operations in this region are attended by serious hemorrhage, for the dura cannot be separated from the cranium without tearing the emissary veins, and cannot be lifted from the brain without tearing the cerebral veins. The motor centers of the lower extremities are difficult of access on account of being covered by the lacuna laterales. Ligature of the sinuses in this region is difficult for the same reason. There is an emissary vein from the beginning of the lateral sinus at the torcular and another in the mastoid region; between these points operation can be performed without danger of annoying hemorrhage. The vein of Galen empties into the straight sinus, the ophthalmic into the cavernous on either side of the sella turcica. Infection may travel easily from the orbit. This sinus together with the petrosal are very liable to injury in fracture of the base. From the petrosal sinus the blood enters the subdural space and escapes through the ear. Of the vessels supplying the meninges the middle meningeal is the most important from a surgical standpoint, on account of frequent injury in fractures. When an obstruction to the venous outflow occurs there are accessory channels through the posterior condyloidal into the spinal veins, through the emissary veins of the diploe, and through the orbital veins..

The cerebro-spinal fluid is secreted in the ventricles, whether by the ependymal cells or in some other way, is unknown. The amount of fluid varies. Normally there is not a great quantity—about like a synovial fluid in a joint. The subarachnoid spaces over the cortex are small and contain but little fluid. The cisternæ at the base are capable of great distension, but normally do not contain a great deal of fluid. The fluid acts in this location as a waterbed and affords protection to the brain at the time of injury.

CLINICAL OBSERVATIONS IN BRAIN INJURIES.

The symptoms of brain injury are general and focal, subjective and objective. Headache may result from even a slight injury, with possibly subsequent edema producing dural tension or distension. The dura is supplied by the fifth nerve, and is extremely sensitive to pressure. Headache is a common manifestation in brain injury after a day or two, when the mental disturbances have subsided. Other common general symptoms are vertigo and vomiting. In certain cases of cerebral injury after recovery the patient may have vertigo for days or weeks. Vomiting in cases of concussion—so-called —and contusion is also common. Various degrees of mental disturbances are usual manifestations, particularly in serious injuries. These may be delirium and mania, or stupor and coma, depending upon whether there is irritation or paralysis of the cortical centers, because all these symptoms are due to either irritation or paralysis.

There may be either concussion, compression, laceration or contusion, and the symptoms here, as in all other forms of mechanical brain disease, are due to either irritation or to paralysis of the cells. Unconsciousness is nothing more than paralysis of the highly psychic cells, delirium represents irritation of these cells. So that in any case there may be one or both.

Not infrequently there may first be unconsciousness, and with the return of consciousness the patient develops severe headache; there may or may not be delirium. In other instances delirium may develop first, and be followed by unconsciousness. It is not uncommon for patients to be taken to hospitals in an unconscious state, and the diagnosis of alcoholism is made. Many patients with cerebral hemorrhage have been taken to county jails, there merely being sufficient injury to produce irritation of the cortical centers resulting in excitement and delirium—at times maniacal delirium. In such cases if there is a distinct odor of alcohol about the patient, and especially upon the breath, the diagnosis of alcoholism is quite natural. Later the irritation of the cortical cells is succeeded by paralysis, and the patient passes from delirium into more or less profound coma. These, then, are the principal general symptoms, (a) headache, (b) vertigo, (c) vomiting with or without nausea, and (d) mental disturbances.

The focal symptoms, of course, will depend altogether upon location of the injury. If the injury inflicted be in the so-called silent area of the brain, there may be no focal symptoms, although convulsions may occur from even slight irritation over this silent area. If it be in the motor area just in front of the Rolandic fissure, there may be either localized convulsions or paralysis. Injury in the post-central convolution will produce various sensory disturbances. If it be in the temporal lobe, various auditory aphasias may be noted. If in the posterior portion of the third frontal convolution of the left side, motor aphasias will result. If in the region of the calcarine fissure, symptoms referable to vision will occur. If around the angular gyrus, word blindness may be expected. If in the cortex of the first or second convolutions, disturbances of hearing may be observed. Injury in the region of the uncinate gyrus produces disturbances in the sense of smell.

The various focal symptoms will depend largely upon the character of the injury, which may be summarized in the four types already mentioned, viz., (a) laceration, (b) concussion, (c) contusion, and (d) compression. These cover practically every injury, and not infrequently all appear in the same patient. A man who falls from a considerable distance alighting on his head undoubtedly has a certain amount of concussion, if this is to be distinguished as something separate and distinct from contusion, a distinction which is not admitted by some, but generally believed and accepted by the majority. The man will certainly have more or less contusion, he may have laceration, and if he does not have hemorrhage, he will probably have secondary edema with resulting compression.

Concussion is a clinical condition about which a great deal has been written, and about which there has been great diversity of opinion. A few years ago it was recognized as a distinct clinical entity, not one doubted that there was a general commotion or molecular disturbance in the brain cells produced by the sudden application of violence resulting in very alarming symptoms which sometimes speedily terminated in death. This pathologic concept is no longer admitted. Many contend at the present time that concussion is nothing more nor less than microscopic contusion, i. e., that throughout the brain there will be found evidences of hemorrhage, that if the brain be examined after death indications of extensive injury will be apparent, punctate subpial hemorrhages, contusion, etc. There are certain cases, however, in which even the microscope has been unsuccessful in demonstrating traumatic lesions, athough death had been almost instantaneous. Various theories have been advanced to explain this. For instance, Crile, Cannon and others depend upon the theory of shock. Kocher and several other observers have spoken of increased intra-cranial pressure, the brain being hurled against the opposite side, the cranium bent inward upon one side and being unable to free itself immediately pressure is exerted in certain areas; the blood is thus forced out of it, as always occurs in concussion; anemia of the deeper centers results, and death is almost instantaneous. The centers are so completely overwhelmed by the sudden increase of pressure and sudden anemia that they are paralyzed and unable to recoup, and death immediately supervenes.

The symptoms of concussion are: Slowing of the pulse, slowing of the respiration, a weak pulse, the pupils are either dilated or contracted. In some instances blood pressure may be reduced, and respiration increased; in others the pulse may not show much of a vagal character, although usually slow and often the tension may be higher than normal.

It must be confessed this is a rather confusing list of symptoms. If it be remembered, however, that all the symptoms are due to either irritation or paralysis, the apparent discrepancies may be readily explained. For instance, if there be stimulation of the vasomotor and vagus centers, a slowing of the pulse with increase in the blood pressure may be expected; but if there has been any degree of paralysis, the pulse rate will be increased and blood pressure lowered.

There is sometimes but little difference in degree between the symptoms of concussion and contusion. The symptoms of concussion may exist for a few hours or a day, and the patient then seems improved. The pendulum then swings in the opposite direction, and the unconsciousness is replaced by delirium, the patient suffers from headache and vertigo, the result of secondary edema. Following the headache and vertigo a neurosis may develop and persist for a considerable period of time. In such cases it is only fair to assume that the concussion was either accompanied by or was in the beginning a contusion.

In contusion there is more extensive injury to the brain substance, and the symptoms are more marked. There is also greater danger of more lasting evidence of brain disturbance than in ordinary cases of concussion.

The symptoms of compression, aside from the local symptoms resulting from a depressed fracture or from blood clot over a focal area, are largely those referable to the pulse, the respiration and the state of consciousness. In the milder grades of compression there may be headache, some mental disturbance, slight irritability; while there may be yet no increase in the blood pressure, there is usually a slowing of the pulse rate. The pulse becomes slower, and the slowness persists, and is due to stimulation of the vagus center; in other words, it does not respond as quickly to the various changes in intra-cranial pressure as does the vasomotor center. The respiration is usually slowed somewhat even in the milder cases. The blood pressure at this stage is not increased, which is a point of importance. Sometimes we have depended too much upon the variations in blood pressure as demonstrated by the sphygmomanometer.

It must be remembered that the blood pressure increases only when the compressing force equals or exceeds the blood pressure in the systemic circulation. As compression increases the cerebrospinal fluid escapes, the vascular exits are blocked, the blood cannot get out, and the veins remain distended. When the compression reaches about six per cent of the total volume of the cranial contents, then the ordinary intra-cranial pressure reaches the height of the arterial pressure in the systemic circulation with resulting sudden collapse of the capillaries supplying the brain tissue. That invariably means sudden anemia of the brain. The cerebral anemia stimulates the vaso-motor, the vagus, and the respiratory centers. Hence, as the result of vaso-motor stimulation there is increase in blood pressure of the systemic circulation; stimulation of the vagus center slows the heart action; stimulation of the respiratory center makes the respiration slow; and the vaso-motor center raises the systemic pressure of the circulation to a point where the brain is supplied with arterial blood. If the compressing force stops, the blood pressure will remain there. If, however, the compressing force is from hemorrhage or increasing edema of the cranial contents, this shortly reaches the height of the increased blood pressure, and cerebral anemia again results; again these centers are stimulated, the pulse becomes slower, the blood pressure mounts higher, and respiration again becomes slower. This process may be repeated time after time until the limit of endurance is reached, the vaso-motor centers are paralyzed as the result of over-stimulation and the increased work placed upon them, blood pressure decreases and the pulse becomes rapid, an indication that the struggle is about to terminate in victory for the compressing force.

The only manifestations observed in the examination of subjects having compression, aside from the general symptoms of headache, vertigo, etc., which may be present, are eye changes. The eye changes at this stage are not in the nature of choked disc: they consist in dilatation of the veins and narrowing of the lumina of the arteries, but not typical choked disc. They are often transitory, and that is the reason that so frequently in examination of the eye-grounds for ocular lesions nothing abnormal is noted, i.e., the change has not persisted for any length of time; in other words, one examination is not sufficient, and frequent examinations must be made or the condition will be overlooked. All the authorities on this subject suggest that the patient be closely watched, because of the short time that the eye shows this symptom, and the rapidity with which it returns to normal.

In the diagnosis of brain lesions, as may be readily seen, it is not an easy matter to always differentiate between concussion, contusion and compression of mild degree. In fact, in the majority of instances some of the symptoms of all three lesions may be present in one individual who has reached the stage of unconsciousness which persists for any great length of time. In a case of compression that has reached an extreme degree, of course the diagnosis is easily made from the pressure symptoms. The presence of increased intra-cranial pressure may sometimes be determined by means of spinal puncture. This procedure is comparatively safe, excepting when the blood pressure is high. If the blood pressure is very high, showing marked increase in the intra-cranial pressure, then spinal puncture and withdrawal of any fluid is dangerous, because of the fact that the medulla is crowded downward into the foramen magnum and fatal anemia may occur from this mechanical condition alone. It should always be undertaken with caution, and the pressure of the cerebro-spinal fluid should be registered before any fluid is withdrawn. This is easily accomplished by attaching a graduated glass tube to a canula inserted into the spinal canal, and noting the height of the fluid in the tube. Where there are manifest symptoms of increased intra-cranial pressure, and the pressure of the cerebro-spinal fluid is low, my rule is invariably not to withdraw any of the cerebro-spinal fluid, because, in my opinion, there is already a partial blocking of the foramen magnum, the cerebro-spinal fluid is not flowing freely into the spinal canal, and even if but a small quantity be removed the vaso-motor centers may be overcome and fatal anemia result.

In many cases of edema of the brain following contusion or concussion, relief is afforded simply by means of spinal puncture alone, but this should never be undertaken when compression is great, or when there is diversity between the intra-cranial pressure and the pressure in the spinal column.

The treatment of so-called concussion of the brain consists in keeping the patient absolutely at rest, cold applications to the head, the use of stimulants when indicated; if blood pressure is low, the administration of remedies which tend to increase the blood pressure; the use of sedatives, such as the bromides, or, what is better in the majority of cases requiring sedation, morphine or heroin. After the acute symptoms have subsided, it is necessary in the majority of cases to combat the sequelæ, which are usually headache and vertigo. Either or both these symptoms may persist for a long time after other evidences of concussion have disappeared.

I now have under observation a man who was rendered unconscious by a severe blow on the head, and who has at no time exhibited any symptoms of compression, as shown by changes in the eye-grounds or increase in blood pressure. The period of unconsciousness lasted twelve hours. Since then he has suffered from headache and intense vertigo; on leaving his bed suddenly he has repeatedly fallen: in walking across the ward in the hospital he invariably stumbles; tinnitus aurium has been another distressing symptom. Careful examination of the ears failed to disclose any evidence of local injury.

The treatment of these sequelæ is very trying. In my experience the best results are obtained by sedatives, good nutrition, freedom from worry, and such remedies and measures as are calculated to improve the general condition of the patient. There is a marked tendency on the part of these patients to develop permanent neuroses. We cannot help but wonder, in this class of cases, just how much and what character of injury the brain sustained at time of the violence, and it is just such cases that lead us to strongly suspect that concussion, so-called, often means serious brain injury which has not produced the characteristic local or general symptoms which we have been taught to expect.

Contusions and lacerations of the brain are seldom so diagnosed, excepting in cases of compound fracture, gunshot or other penetrating wounds of the cranium. They produce no characteristic symptoms, and are usually found as a part of the pathology in cases where the diagnosis of concussion or compression of the brain has been made.

In compound fractures with extensive laceration of the brain substance, in my opinion, it is always advisable to cleanse the wound as thoroughly as possible, and after having elevated and removed such fragments of bone as necessary to trim away the lacerated brain tissue which manifestly will not survive the injury. In such cases drainage should always be employed. The danger of infection from without at the time or subsequent to the injury is so great as to render drainage imperative.

Compression of the brain may be either localized or general. Depressed fractures of the cranial vault, if in the silent area of the brain, may produce but slight general symptoms. The period of unconsciousness (if such exists) is usually not very long. So slight are the symptoms, and so little alarm do they produce in the minds of the relatives and the patient himself, that very often they are loath to submit to any operative treatment. In these cases the patient should usually be operated upon; the depressed bone elevated, any extra-dural or sub-dural clots removed when possible, and the incision closed without drainage unless the fracture is compound. The remote effects of such injuries when left untreated are familiar to every surgeon. If the patient and those near to him could see the results that so often obtain from failure to operate upon these patients, the number of cases of traumatic epilepsy and traumatic psychoses would be reduced to the minimum.

Localized compression may result without a depressed fracture, or, indeed, without any fracture at all. A linear fracture with extra-dural or sub-dural hemorrhage will produce the same results as a depressed fracture. In such cases, if there are localized symptoms, the treatment is a comparatively simple matter, viz., trephine and remove the clot or as much of it as may be possible. If hemorrhage occurs in the silent area of the brain, and is not sufficiently great to produce general symptoms of compression, then the diagnosis will in all probability not be made, and the lesion will be left for the efforts of nature alone to effect a cure. When the general symptoms or compression make their appearance, we are dealing with a very serious condition and one which requires the employment of our very best judgment. The patient must be constantly watched; any changes in the pulse-rate, respiration, blood pressure, state of consciousness, condition of the fundus of the eye, pressure of the cerebro-spinal fluid, should be carefully noted and correlated. If the compression is of mild degree, the better plan is "to play a waiting game" so far as surgical intervention is concerned. The patient should be treated by cold applications to the head, thorough purgation, and the use of such remedies as will meet special symptoms as they arise. If under this management the compressing force becomes greater, as shown by rise in blood pressure, slowing of the pulse and respiration, changes in the fundus of the eye previously mentioned, and marked increase in pressure of the cerebro-spinal fluid, then careful and serious consideration must be given to surgical measures in order that we may afford relief before the stage is reached in which neither surgery nor any other treatment will avail.

The surgical treatment in these cases consists, where there are no localizing symptoms or signs, in sub-temporal decompression. If the injury to the brain be not too extensive, and if the operation is performed before fatal damage has been done the medullary centers, we may at least hope for a favorable result in a considerable number of instances. It is a mistake, however, to postpone operation until development of positive signs of paralysis or beginning paralysis of the medullary centers, as shown by increase in the pulse-rate, lowering of the blood pressure, etc. Operation then can only add to the shock and hasten the fatal result.

No doubt in many of these cases, were we able to determine it, there is simple edema of the brain resulting from contusion, and in such instances the patient would probably be relieved by spinal puncture alone. Unfortunately we have no sure means of determining when edema alone exists; moreover, we have been taught, and as a result of our teaching, we fear to employ lumbar puncture on the mere manifest signs of increased intra-cranial pressure. Personally, and as before stated, I believe if there exists the proper relationship or ratio between intracranial pressure and the pressure of the cerebro-spinal fluid, lumbar puncture is comparatively safe.

A great many of these cases are attended by fracture of the base of the skull. While the fracture in itself amounts to little, the force which is sufficient to produce the fracture often causes serious injury to the brain itself. Again, and as before noted, fracture of the base is frequently associated with laceration of the petrosal and cavernous sinuses on account of the intimate attachment of the dura to the surface of the bone. This also opens an avenue for infection when the line of fracture extends into the middle ear, the pharynx, or the posterior nares.

I am convinced that many patients with fracture of the base recover without operative treatment. I am of the opinion that fractures of the base are not entirely hopeless as we were formerly taught, and I am not one who believes that if the patient gets well he did not have a fracture of the base however much the symptoms may have indicated it. I am sure that I have seen several such patients recover. The percentage of cures will be greater if we do a decompression operation and relieve to an extent at least the threatened anemia of the bulbar centers.

DEFORMITIES OF THE NASAL SEPTUM. THEIR CORRECTION BY AN IMPROVED TECHNIC FOR SUBMUCOUS RESECTION.

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Until rather recently, probably no operation upon the nose and throat has met with more criticism of the medical profession than submucous resection of the nasal septum. This criticism in many instances was, and still is, justifiable, inasmuch as frequently the operation has been performed without any attempt to arrive at clear and definite indications. In general, three well-defined indicatons for performing a submucous resection upon a pathologically deformed septum are recognizable, each pointing to a rather distinct type of deformity. The general indications are defective breathing, defective drainage and reflex symptoms from pressure upon or from adjacent structures; one or more of these indications may be present. Needless to remark, all other causes, intranasal and post nasal, such as hypertrophied inferior turbinates, hypertrophied posterior tips of inferior turbinates, adenoids, polyps, etc., must first be excluded. Not infrequently I have seen cases in which the operation for relief of deflection of the septum was entirely successful from a cosmetic standpoint, and yet the patient had obtained little or no relief, owing to a failure to recognize and remove a rather large adenoid. Likewise, however perfect the result may be from the standpoint of correction of the deformity, one recognizes the futility of the operation unless, at the time of the resection, narrowing of the introitus of the nose from projection of alar cartilage or dislocation of septal cartilage is first remedied. Hypertrophy of the inferior turbinate, frequently seen upon the side of the concavity of the septum, and causing defective nasal breathing and drainage, often spontaneously regresses to the normal upon correction of the deformity of the septum, the hypertrophy in such instances simply being of a compensatory variety—nature's attempt to fill in the abnormally large space.

Various classifications of septal deformities are to be found in all the modern text books on rhinology. None to my mind is better than that of F. O. Lewis, as by means of this classification a definite conception of the indications for submucous resection is obtained. First, there is the deviation of the quadrilateral cartilage, caused usually by an injury, in which the cartilage has been fractured or dislocated in such manner that the convexity of the deformity obstructs one side of the nose; the free border of the cartilage projecting into the opposite side with perhaps a compensatory hypertrophy of the inferior turbinate. To correct this the entire cartilage has to be removed, especially if there is a twisting of the tip of the nose. The second type consists of a deflection of both the cartilaginous and the bony septum located usually near the floor of the nose and extending from within the vestibule almost to the posterior nares, impinging against the inferior turbinate, interfering with drainage and ventilation and associated with Eustachian catarrh and subsequently middle-ear deafness. Thirdly, deflection of the vertical plate of the ethmoid, impinging against the middle turbinate, which may be hyperplastic, giving rise to reflex symptoms such as asthma, headache, neuralgic pains about the face, cough. Interference with drainage from the frontal, anterior ethmoid and maxillary sinuses may result from this type. Not infrequently all three types may be present in the same case. The last indication *per se* does not warrant the performance of a submucous resection unless, at the same time, a deformity of the first or second type is present. If a deformity of the third type alone is present the reflex symptoms to which it gives rise may sometimes be eradicated by the removal of the hyperplastic anterior tip of the middle turbinate upon the side of the convexity.

Preliminary to operation every precaution against possible infection should be employed. Thorough cleansing of the face with soap and water should be insisted upon, particular attention being given to the nose and especially to the introitus. Tincture of iodine is applied to the area in the region of the nares, followed by alcohol and sterile gauze 4" x 4" with an opening for the nose is applied over face, and a sterile towel or cap covers the scalp. Nothing to my mind conduces to the greater ease and confidence of the patient than a hypodermatic injection of morphine ¼ gr. with atropine 1/150 gr. one-half hour before the operation. The question of the position of the patient is of the utmost importance. Until the past two years it had been my custom to have the patient in the sitting position—this being the position used by a majority of operators at the present time—and as a result many of my patients would have fainting attacks, necessitating frequent intérruptions of the operation, to say nothing of the harmful or even dangerous possibilities therefrom. This annoying and rather dangerous condition can be almost entirely avoided by having the patient flat upon the operating table, the head being but slightly elevated. This position has the further advantage that it affords a better access to the floor of the nose, the region in which most of the difficulties of a resection are usually found. To one who has been in the habit of having the patient in the sitting position while operating, there will at first be considerable difficulty in acquiring the necessary dexterity, in the supine position, but the advantages soon become apparent after a few trials.

While the operation may be performed under general anesthesia, I have a decided preference for local anesthesia, as the field of operation can not only be rendered absolutely painless but also hemostasis is far better. The proper application of cocain and adrenalin is of first importance in obtaining a painless and practically bloodless operation. The methods of cocainization which I employ is as follows: a cotton applicator moistened with adrenalin 1-1000 is dipped into powdered cocain hydrochloride, and by means of gentle friction, is applied over the entire septum and floor of the nose, especial attention being directed to the area of the septum directly opposite the anterior end of the middle turbinate; this area is ordinarily quite sensitive at first. By renewing the application three or four times, complete anesthesia results in about ten minutes. I have never seen any systemic effects from the application of pure cocain in this manner. Undoubtedly the use of adrenalin with powdered cocain confines its action to the area of application. Instead of this method of producing local anesthesia one may pack the nose with three or four pledgets of cotton saturated with 10 per cent. cocain solution in 1-1000 adrenalin. This is allowed to remain for half an hour.

Before beginning the incision an injection of ½ per cent. solution of novocaine containing six drops of adrenalin, 1-1000, to the half ounce, is made into the integument of the vestibule on each side, this area not having been affected by the local applications; furthermore, the injected solution diffuses itself between perichondrium and cartilage, thus rendering the elevation of the perichondrium less difficult.

An incision is made as near as possible to the entrance of the vestibule of the nose, beginning above and with the convexity directed to the free margin of the cartilaginous septum, and is extended for a short distance (¼" to ½") along the floor of the nose. By prolonging the incision along the floor the probability of tearing the muco-perichondrium is considerably lessened when elevation of the membrane is begun. Beginning the separation with a sharp elevator at the upper end of the incision, where the perichondrium is rather loosely attached, this is continued downward to and along the floor. If the incision has been properly made through the perichondrium, there will be no difficulty in continuing the seperation. Except for the elevation of the perichondrium thus far described, I have been in the habit of completing the separation with a dull, flat elevator, keeping the instrument in close contact with the cartilage throughout. Nothing is to be gained by repeatedly removing the separator while in the process of elevating the mucous membrane.

Having detached the muco-perichondrium on one side, an incision is made through the cartilage following the line of the original incision; the muco-perichondrium on the opposide side is then detached, following the method above described. As much as possible of the cartilage is removed with one sweep of a Ballenger swivel knife. In order to maintain the proper support of the nose ¼" of septal cartilage between the lateral cartilages is allowed to remain. With a Demarast bone forceps deflected portions of the vomer are carefully removed, always being first certain of the complete separation of the overlying mucous membrane. Finally, careful attention should be given the floor of the nose for in this location especially spurs and deflection are usually present. It is my custom to continue, if necessary, the separation of the mucous membrane along the floor with a sharp elevator, then using the Demarast forcepts with a rocking lateral motion, ordinarily no difficulty arises in removing the nasal spine *in toto*. If some still remains the same procedure is continued. In some instances it may be necessary to first loosen the spine anteriorly with chisel and hammer.

Having removed all of the deflected septum, sol.

adrenalin, 1-1000, is thoroughly applied between the flaps of muco-perichondrium, spicules of cartilage and bone are removed and the entire area swabbed out with tincture of iodine. The flaps are then allowed to approximate and are maintained in position by carefully packing each nasal cavity. I remove the packing at the end of the twelve hours. No applications, irrigation, sprays or manipulations of any kind are made immediately after the removal of the packing and for three days following. At the expiration of this period I apply adrenalin solution, 1-300, spray the nose with Dobell's solution and prescribe the latter for the patient's use at home. By strict avoidance of any manipulations in the nose for the first few days, the possibility of infections, such as septal abcess, sloughing of the flaps, etc., can be avoided. Infections have been further reduced by saturating the strips of gauze, before packing, in the following mixture:

Iodoform .... ʒii
Glycerine:
  Distilled water .... aa. ℥ii
Sublimate solution (1-3000) .... ℥ss

Pyramidon, gr. 5 with caffein gr. ½ relieve the distressing headache which often follows the operation and by repeating this once four hours later, if necessary, I have been able to render these patients practically free from discomfort. In a number of instances where conditions were favorable for keeping the patient under constant observation, I have refrained from packing the nose. The objection to this that hematoma between the septal flaps may occur, has been overcome by an antero-posterior incision of the flap on the side through which the original incision had been made, the line of incision being made along the floor, thus allowing for proper drainage. I have not had any cases of post-operative hemorrhage by using this method; after a few days applications of argyrol 25% are made to both nasal cavities on alternate days for two or three weeks.

SUMMARY.

1. The type of septal deformity and the indications for performing a submucous resection should be thoroughly considered before deciding to operate.

2. Adenoids and narrowing of the nares should receive proper operative attention in order to obtain the fullest benefits from submucous resection.

3. The supine position of the patient, the head slightly elevated, is the ideal position while operating. Shock is eliminated, better access to the floor of the nose is obtained.

4. Under favorable conditions, packing of the nose may be dispensed with after the operation.

5. Post-operative manipulations in the nose should be avoided for a few days so as to minimize the possibility of infection.

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NOTES ON MINOR EYE INJURIES.*

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The most trivial injury to the eye, through neglect, ignorance or mismanagement, may result in total loss of vision in one or both eyes, disfigurement or even death. In all cases of severe injury there will be diminution of the earning ability of the individual, with pain and suffering entirely out of proportion to the same character of injury inflicted upon other structures of the body. The treatment of a wounded eye should be conservative from the first, to retain as much vision as possible, to preserve the cosmetics of the organ, and in some instances even to save the life as well as to relieve the agony of the injured individual.

With the foregoing in view we must consider, first, those methods which will give the best results as regards vision, and second, as regards the appearance of the globe and its surroundings, always bearing in mind the dreaded possibility of sympathetic ophthalmia in the other eye, and also remembering the operation of enucleation or its substitutes with which to combat this possibility.

As a rule an injury to the eye immediately incapacitates the individual from pursuing his employment of pleasure, and he may be so blinded as to require assistance in getting to a place of safety. Wurdemann says the public should be taught that as a rule "first aid" to injured eyes consists in letting them alone, other than to apply a clean cloth bandage, and to immediately seek the aid of the physician; excepting where large quantities of foreign material, such as sand, dirt, of corrosive substances (lime or other chemical) enter the eye, in which event free douching with clear water is required. The application of such household remedies as tea, milk, honey, urine, beefsteak, bread-and-milk poultices, chamomile, sage-tea, etc., should be forbidden, as they act only as a poultice and thus assist in the growth of germs. The eye is in no wise a boil to be "drawn out."

On account of the pain, photophobia and lachrymation it is generally necessary to apply a local anesthetic to the injured eye before a satisfactory examination can be made. For this purpose a solution of two to four per cent. cocaine or two per cent. eucaine may be used. In no case should a local anesthetic, such as cocaine, be entrusted to the patient to be used for the relief of pain, the latter being nature's warning of danger and her call for relief. Cocaine frequently repeated causes tissue damage by depleting the blood supply, with resulting dryness and exfoliation of the ocular conjunctiva.

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*Read before the West End Medical Society, of Louisville, Ky. May 9, 1916.

Dionin is a true analgesic and may be freely used in a five per cent. solution. After the first few applications the conjunctival edema which it causes does not recur, but the anelgesic effect remains unimpaired and more or less relief for several hours is thus afforded. Rest of the ciliary muscles and iris by the use of cycloplegics and mydriatics is helpful in preventing pain. In exceptional cases morphine may be administered hypodermatically.

The therapy of the wounded eye is based upon surgical principles from beginning to end, and the watchword is asepsis. The anti-sepsis of the wound is best achieved with a ten per cent. silvol or a twenty-five per cent. argyrol solution frequently repeated, and continued so long as there is any evidence of an abrasion.

Injuries to the conjunctiva should be treated as strictly surgical lesions. Care should be exercised to prevent an excessive amount of scar tissue. Another point never to be overlooked is adhesion of the palpebral to the ocular conjunctiva. This is a complication frequently seen and one which may give the physician a considerable amount of trouble.

Particles of coal, cinders and pieces of vegetable matter rarely require instrumental means of removal; but particles of stone, emery and metal may be driven into the conjunctiva with considerable force, and it is sometimes necessary to literally "dig them out." A cataract knife is a splendid instrument for that purpose.

Blasting and dynamite explosions may cause the impaction of a large number of foreign bodies in the conjunctiva. Removal of the foreign bodies is not all that is required; in many cases it is necessary to excise a portion of the conjunctiva with forceps and scissors to remove stains that are left. Foreign bodies that are too small or too transparent to be readily observed may be removed with a soft cotton brush.

Foreign bodies upon or within the cornea are frequently seen, and should be removed under a local anesthetic so as to lessen the danger of doing more damage to the cornea by the operation than is done by the foreign body. Workmen in shops frequently become quite adept in removing foreign bodies from the cornea. In many instances, however, badly infected eyes result from the use of non-sterilized pins, knife blades, horseshoe nails, etc., and the non-use of antiseptics. The worst cases with which we have to deal are those that have been unskillfully handled by the patient's associates at the shop or on the road, or by some physician whose eyesight and manual dexterity are not sufficient to enable him to remove the foreign body without causing more damage to the eye than probably would have resulted had it been left alone.

In the case of deeply penetrating objects, such as metals, splinters, particles of sand, stone, etc., special care must be taken to avoid puncture of the cornea. Infection may cause corneal ulcer, iritis, and numerous other dangerous complications. The diagnosis is generally made by the patient, but much depends upon the physician as to what complications may ensue.

This paper is limited to the care and treatment of minor external injuries to the eye, and must not be interpreted to refer to the more serious injuries, such as punctures of the anterior or vitreous chambers, dislocation of the crystalline lens, detachment of the retina, and many others of dangerous nature.

The locating of very small foreign bodies on the cornea is frequently a tedious proposition, requiring acute eyesight, a proper magnifying glass, and a strong light. After the diagnosis has been made, under local anesthesia if necessary, the eye should be well irrigated with a reliable antiseptic and again cocainized. The foreign body is then removed with as little traumatism as possible. If there is much ciliary inflammation the use of atropine solution, one grain to two ounces, is advisable, and solution of silvol or argyrol should be used in the eye at least every hour. Extreme heat or cold applied to the eye for fifteen or twenty minutes will frequently give much relief.

The patient should be kept under observation as long as there remains the least sign of abrasion or ciliary congestion, and shade glasses should be worn. In many instances there will be found considerable scar tissue which it is necessary to absorb by the use of dionin, yellow oxide of mercury ointment, and massage with oil. This process is usually slow and tedious, but in many cases good results are secured.

While Berger's binocular loupe with large plus lens have been found of great service in locating small foreign bodies, yet it is necessary at times to use the ophthalmoscope.

The care of the eye following a lime burn is very tedious and not to be entrusted to the patient. Within twenty-four hours a synechia may be formed that will prove very annoying. Use weak acid at first, and be sure that the adhesions are separated several times each day.

CARBOHYDRATE FEEDING IN SURGICAL CASES.

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In a series of eighty laparotomies, thirty-four with and forty-six without special attention to diet before and after operation, the post-operative benefits derived in the cases with special diet was very marked. These benefits consisted of less abdominal distention, often no abnormal gas formation, more perfect healing, and markedly less distress both mental and physical.

The 34 cases selected for special diet included 7 gastro-enterostomies, 1 partial resection of the stomach, 3 resections of the intestines, 10 appendicectomies, 7 gall-bladder cases, 2 Cesarian sections and 4 operations upon the uterus and adnexa. In all cases there was marked improvement over similar cases on ordinary hospital diet.

Nearly all who observe surgical cases are impressed with the fact in two patients with the same disease, e. g., chronic appendicitis, on whom similar operations are performed and in whom the previous physical conditions are to all observances similar, that one case goes on with practically no post-operative distress and the other suffers very considerably. Why does this occur? Why do not all cases proceed smoothly? It has been attributed to differences of nervous stability on the part of the patient, to psychic shock, etc. Yet in cases where the psychic shock is admittedly great, as in major operations with local anesthesia, we have seen smooth recoveries. The general anesthetic, ether or chloroform, certainly accounts for much of the post-operative distress. Stomach washing helps this; but still there is much to be desired.

In preparing a patient for operation it has always been the custom to permit him to eat about anything desired up to the day previous to operation and then by purges and enemas to empty the intestinal tract. After the operation the patient is usually too nauseated to desire food. For the first few days he receives a little orange juice or broth or buttermilk, if he likes it, or almost any "liquid diet." This means that he is practically on a "starvation diet" for three or four days. We are told that patients "usually feel better after the bowels move," but we all know that frequently they do not feel better.

After most laparotomies the patient's digestive apparatus is disordered and he does not absorb an over-abundance of nutriment. On questioning in 80 laparotomy cases, I found that they have been eating those things which they believed nutritious, as beef tea, milk, eggs, a little meat or fish and usually very small quantities of food rich in carbohydrates. This means that most of the carbohydrates ingested are used up within a few hours and very little stored up in the liver as glycogen. Therefore during these days after operation, these patients live on their own protein bodies and fats. It has been repeatedly shown that on a rich protein diet, there is generated a great excess of decomposition products, harmful to the body unless rendered inocuous by the liver. This is evidenced by the increased excretion of acetone and diacetic acid in the urine during starvation. (Emerson.)

A casual examination shows, as Cushny points out, that almost all the narcotics are methane (CH_4) derivatives, and I may add that acetone and diacetic acid are also such. Now, in diabetes —to digress for a moment—the onset of danger is usually foretold by the increase of acetone and diacetic acid, and the coma is, we are told, an acidosis due to diacetic acid, "the mother substance of acetone." When the strict dietary treatment of diabetes was first practiced the clinicians were surprised at the number of cases of coma, i. e., they noted that with the withdrawal of carbohydrates for a considerable time, permitting a diet rich in proteins, the patients' condition is worse. They develop an acidosis. Clinicians found that to return for a short time to carbohydrate food frequently averted coma.

Is it not reasonable to expect when we are using considerable ether, a product closely related to acetone (ether $C_2H_5—C_2H_5=O$; acetone $CH_3—CH_3=CO$), a methane derivative as both are, that we might assist nature in preventing an acidosis or in lessening it, by the use of a carbohydrate diet for a few days before and after an operation? That there is an acidosis after chloroform anesthesia has been proven by Von Jaksch, by increase of acetone in the urine. In 10 cases of ether anesthesia, I found acetone present in the urine for 24 hours following. Von Jaksch stated that acetone is increased whenever the carbohydrates of the diet are eliminated. Emerson stated that the amount of acetone excreted may be reduced by adding carbohydrate to the food. That this and other by-products formed in the body of patients on a rich protein diet (almost a starvation diet) following an operation, and especially when a general anesthetic is used, are responsible for many of the discomforts and for faulty wound healing, I firmly believe. I also believe that by proper regulation of the diet before and after operation, we can greatly mitigate the suffering of our patients and lessen the period of disability.

The special attention to diet consists in elimination from it meat and eggs for three or four days previous to operation and after operation using a solution of malt sugar or 20% dextri-maltose, 5 ounces per rectum every 4 hours, if awake, for three days. In 7 cases of pyloric stenosis 20% solution of dextri-maltose, was used per rectum, 5 ounces every 4 hours for three days prior and four days subsequent to operation.

The post-operative results follow:

Of the 34 test cases, 7 gall-bladder cases were drained, 26 had primary union, one had serum under the skin, which absorbed *without suppuration. All clean cases healed clean.*

There were no disagreeable symptoms, as nervous excitability, or gas distention and no considerable degree of nausea or vomiting.

Of the 46 control cases of similar nature, 6 gall-bladder cases were drained, 3 healed by primary union, 6 had serous exudate which absorbed without suppuration, 3 became infected. Therefore 7.5% became infected of cases, primarily clean. In other words, their resistance was below normal. Fully 75% had considerable gas distention, an equal number were anxious and excited, 85% vomited or were considerably nauseated.

The only difference between the test cases and the controls was in the administration of an excess of carbohydrates before and after operation. This, whether through some affinity to the noxious substances generated or by supplying a readily available source of energy to the body and especially to the purifying plant of the body—the liver, seems to tip the balance in favor of the patient.

Tuberculosis of the Kidney.

An early diagnosis is of first importance, and in no condition is a careful history taking more essential than in tuberculosis of the kidney. Should a patient present himself with a history of frequent and painful urination, loss of weight, vague pains in the back, digestive disturbances and blood or pus in the urine, we should first disprove tuberculosis of the kidney before assuming it to be absent. If the tubercle bacilli are found, we have ratified our suspicions, and then it would only remain to determine the extent of the involvement, and treatment to be given. If albumin is present without any other satisfactory reason, and there are present other signs which point to tuberculosis of the kidney, we are well on the road to a correct diagnosis, especially if pus is found.—Paul W. Howle, in *The Virginia Medical Semi-Monthly.*

THE INJECTION OF METHYLENE BLUE TO FACILITATE THE SURGICAL TREATMENT OF CHRONIC DACRYOCYSTITIS.*

John Guttman, M.D.,
New York City.

Diseases of the tear passages are on the borderline of affections of the eye and of the nose. The eye is the organ most commonly involved in this disease because the presence of a sac filled with pus containing virulent micro-organisms is a constant menace to the cornea and conjunctiva by inducing conjunctivitis, epiphora and ulcus corneæ. On the other hand, the nose, with its accessory sinuses, is most frequently the etiological factor in diseases of the tear passages.

In Kuhnt's experience (*International Larygological Congress,* Vienna, 1908), diseases of the lacrimal passages have their origin in the nose in 95 per cent. of the cases.

A contention has lately arisen between the nose and the eye specialists as to whose domain the treatment of this disease belongs. As a matter of experience, we know that when numerous remedies have been offered for the treatment of a disease, none of them, as a rule, is perfectly satisfactory. The nihilistic school treated conjunctivitis and epiphora, the sequelæ of this affection symptomatically, with astringents, or with injections of nitrate of silver to the tear canals and tear sac. Others advocate the use of probes for the dilatation of the tear passages. This method of treatment in some cases produces more harm than good; it is very painful, it lasts very long (many months or even years), and sometimes by making false passages one is liable to bring on a condition much worse than the original disease.

For stenosis of the tear passages beyond the lacrimal sac, Toti, Polyak, West, Halle and others devised an intranasal operation for the artificial drainage of the lacrimal sac. This operation can never become very popular for the following reasons: 1. It is quite a difficult operation, and in a naris narrowed by a deviation of the septum, this deviation must first be corrected by a submucous resection before the intranasal operation on the lacrimal sac can be undertaken. 2. The artificial communication between the lacrimal sac and the nose often closes prematurely and the result of the operation becomes nil. 3. It leaves the lacrimal sac, which is the source of great danger to the eye, on account of the virulent micro-organisms contained therein, *in situ*. The extirpation of the lacrimal sac through an external wound is therefore the favorite method of treatment by most ophthalmologists. This method practically leaves no scar, it brings about the quickest cure, it eliminates the most dangerous source of infection, the lacrimal sac. The disadvantages of this operation, like those of all others, are, first, that there are some cases where the epiphora remains and an extirpation of the lacrimal gland becomes necessary, and, second, the operation is rather a difficult one in the hands of operators who may not be very skilful or whose experience in this direction may be limited.

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*Read before the Ophthalmological Section of the N. Y. Academy of Medicine, May 15, 1916.

To differentiate the thin reddish walls of the lacrimal sac and to reach it in the short deep tunnel-like wound, without deviating to the right or to the left, that is, either towards the nose or towards the orbit, is a very difficult task. This latter deviation towards the orbit may become a source of a severely annoying hemorrhage, to check which will necessitate considerable time, and in rare cases it may cause intraorbital abscess with all its possible sequelae.

In order to overcome this difficulty of the operation and to make the lacrimal sac easily recognizable, numerous devices have been suggested. Some perform the operation in two sittings; at the first one the opening into the sac is made and the cavity packed with a piece of gauze in order to stop the hemorrhage; at the second, twenty-four hours later, the cautery is applied. Surely, a very unpleasant interruption. Some introduce a probe into the lacrimal sac in order to make it more distinguishable. This is not a very commendable procedure, because the canaliculis must be slit in order to introduce the probe, and because the probe in the wound takes away valuable space which is necessary for the proper shelling out of the lacrimal sac. Some advised the use of plaster of Paris or paraffin. The disadvantages of this procedure are, that the canaliculi are very narrow, the plaster of Paris must be very thin and watery, and it takes a long time for the water to evaporate; therefore this method has hardly any followers. In one case I used paraffin with results which were far from satisfactory. On account of the narrow canaliculi the paraffin must be used in a hot liquid form. A hot fluid in the vicinity of the eyeball is very dangerous, because by some spilling of the paraffin the eyeball may be burned. The paraffin occludes the tear passages, and in my case, although I curetted the lacrimal canal at the end of the operation, the wound did not heal by primary union, but suppurated for several weeks. I had to perform a secondary operation to remove the hardened paraffin from the wound as well as from the lacrimal canal, and after this it took two weeks for the wound to heal.

In order to avoid all these difficulties an injection of methylene blue with a lacrimal syringe into the lacrimal sac will greatly facilitate this operation. After the skin, superficial fascia and orbicularis muscle fibers are cut through the distinctly blue-colored sac shines through the deep fascia and all there is to do is to keep close to the blue walls of the sac and to avoid prematurely injuring its walls. When the sac is incised for the purpose of extirpation the methylene blue fills the wound, but at this stage of the operation when the sac is held fast by the forceps not much damage can be done, because the sac has been found and the aseptic methylene blue can do no harm to the wound.

60 St. Marks Place.

A PROSTHETIC APPLIANCE DEVISED AND CONSTRUCTED BY DR. J. PORTER MICHAELS OF PARIS, TO REPLACE A NECROSED SHOULDER JOINT, REMOVED BY DR. PÉAN.*

E. A. Bogue, M.D.,
New York.

It is a pleasure to comply with the chairman's request, and to present an appliance made many years ago by Dr. J. Porter Michaels, a dentist of Paris, for the restoration of the left shoulder-joint of Jules Pedoux, twenty-seven years old, a baker of Paris.

Pedoux was suffering from tubercular osseous necrosis. The operation was a resection of the humerus, about half its length, performed at the International Hospital, Rue de la Santé, Paris, by Dr. Péan, March 11, 1893. On November 8, 1893, the patient was doing well, and in the summer of 1894, about a year and a half after the insertion of this prosthetic restoration, which was called "osteo-brachiale-plastic," the patient drew the corks from bottles of beer and poured out the contents, handing us the glasses, and also took dinner, using a knife and fork without attracting any attention.

The prosthetic piece was made of black rubber, vulcanized and mounted with platinum. This was attached with screws to the humerus while the head of the apparatus, having almost all of the movements of the ball and socket joint, was attached by platinum screws to the scapula, the capsular ligament being held in place by two platinum loops. The ingenuity exhibited in devising and executing such an apparatus is marvelous, for it gave almost exactly and without apparent friction all the movements of the shoulder joint, up and down, backward and forward, and sideways as well. The apparatus was inserted within the periosteum and the proliferation of bone was later observed by means of the then recently discovered *x*-ray until it seemed desirable to remove the apparatus lest it should hinder complete recovery.

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*Presented, by request, before the Surgical Section of the N. Y. Academy of Medicine.

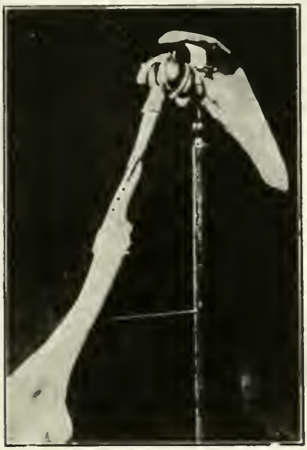

Fig. 1.

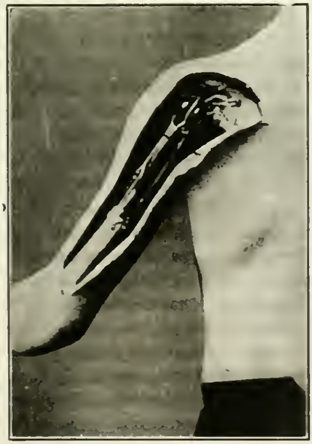

Fig. 2.

Dr. Péan removed the appliance and closed the wound, after which I never saw the patient, but I have been told that the deposition of bone continued until there was a fair restoration of the parts, with, however, a little shortening. The wonder is that so large a mass of extraneous matter could have been tolerated for so long a time beneath the periosteum.

There were several small abscesses that supervened and had to be opened. The general health of the patient improved after the operation and remained good until I left.

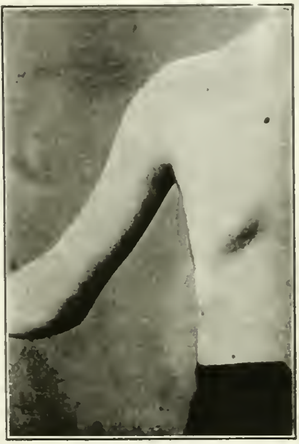

Fig. 3.

I present this unique and ingenious prosthesis, not as an example to be emulated, but rather as a surgical curiosity of historical interest, demonstrating the occasional long toleration by the tissues of a large foreign body.

FRACTURE OF THE INTERNAL CONDYLE OF THE HUMERUS.

The line of fracture of the internal condyle runs into the joint to the trochlear surface of the humerus. The cause is nearly always direct violence as a fall on the condyle. This fragment of the condyle, accompanied by the ulna, goes upward and backward, and when the forearm is extended the olecranon projects posteriorly, and the lower end of the humerus can be felt in front. Crepitus and mobility can be detected by flexing and extending the forearm. Other symptoms that are pronounced are the space between the condyles is wider than normal, the forearm takes a bend towards the ulna side, because the broken condyle ascends, producing loss of "carrying function," or the deformity known as gunstock deformity.—Duncan Eve in *The Southern Practitioner*.

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WALTER M. BRICKNER, M.D., Editor

New York, August, 1916.

THE ORGANIZATION OF MEDICAL PREPAREDNESS.

Large, indeed, is the number of American physicians available for volunteer service in case of war; and loyally would that service be rendered. Vast, indeed, are the resources, actual and potential, of medical equipment and supplies that could be called upon; and many are the generous purses that would supply them. But just who, what, where are these resources of personnel and materiel; how nearly are they organized and ready; to what extent are our Army and Navy Departments supplied with detailed information concerning the special qualifications of each available civilian physician, the equipment of various hospitals, the preparedness of hospital "units" and the equipment of volunteer organizations, so that they may be called upon, as needed, and utilized where their efficiency will be maximum?

In two important measures the federal government has, to be sure, made distinct, but still insufficient, advances in medical preparedness for the national defense:

First, the creation of the Medical Reserve Corps of the Army and of the Navy. In these corps, large but not yet large enough, are many young physicians whose services would much be needed (in field, evacuation and base hospitals, in ambulance companies, recruiting depots and mobilization camps), and a large proportion of the eminent surgeons and internists of the country (on whom, no doubt, the direction of base hospitals would devolve). Many of the Army Medical Reserve Corps have been actively interested and have taken advantage of the opportunities for instruction by correspondence course and at camps. This corps, as such, goes out of existence next year, but it will be continued, essentially, as the Medical Department of the Officers Reserve Corps that is to be created, and in which, it is to be hoped, a still larger number of physicians will seek commissions. Indeed, it seems reasonable to believe that the Medical Reserve Corps was the inspiration for the formation also of a reserve corps of officers of the line.

Second, in 1911 the American Red Cross was made the agency for the formation and equipment of reserve medical organizations for the army and navy, each unit thus organized to become a part of the medical department of the military forces if called upon for service in war. The national Red Cross has been gradually developing its work along these lines and recently various state branches have been very active in securing the money and the personnel for the establishment of "base hospital units" and ambulance corps. In this effort, made with the cooperation and under the direction of Col. Jefferson R. Kean, U. S. A., as director-general of medical relief of the American Red Cross, the society has thus far been very successful, and it may be hoped that in a short time several base hospital units will be quite prepared for service. Few, if any of them, however, are at present as well organized in either personnel or equipment as the newspapers have made it appear. There are, too, many points to be satisfactorily settled, concerning length of service and the relations of the "base hospital unit" to the parent hospital from which its staff is recruited, before the establishment of these units can be regarded as more than mere paper organizations. At present, enrollment in these units is for two years' service, a period that many who have volunteered in the units are unwilling to pledge. Very few physicians indeed can abandon their practice for two years without financial and professional ruin. It is a sacrifice that should not be asked of them unless the country were actually invaded by a large force. Much more reasonable and more practical, it seems to us, would be a service of about six months, the parent hospital maintaining the personnel of the unit by the rotation of acceptable volunteers from its staff. Such a system obtains, we are told, among the medical volunteers in the European Red Cross hospitals.

The establishment of a reserve body of medical officers and the organization by the Red Cross of the personnel and equipment of medical relief such as would be needed in war, seem to afford a substantial basis of medical preparedness for national defense. But a much more thorough organization of the medical resources of the country is possible, and the medical needs of the present war have clearly indicated that it is very desirable. The value of a complete inventory of such resources appears to have been appreciated and the suggestion was communicated to some civilian physicians. As a result of this the presidents of the American Medical Association, the American Surgical Association, the Congress of American Physicians and Surgeons, the Clinical Congress of Surgeons of North America, and the American College of Surgeons have jointly formed a Committee of American Physicians on Medical Preparedness to "cooperate in developing the civilian and reserve medical resources of the country to the highest point of efficiency." Representative sub-committees have been appointed in all the States and Territories.

An Executive Committee of ten, of which that master organizer, Wm. J. Mayo, is chairman, in a letter addressed to President Wilson in April thus expressed the purpose for which this Committee of American Physicians tendered their services:

> "1. To establish, through the membership of the above named medical organizations and their affiliations with local medical societies of the States and territories, an organization that would be in a position to make a comprehensive survey of the medical resources of the country.
>
> "2. To make a complete invoice of such resources available in peace and in the emergency of war. This invoice would include not only the names of men available for field or home duty who are trained in the specialties of medicine, surgery, and sanitation, but it would also include in minute detail for each community the equipment of the institutions with which these men are connected, such as hospital facilities, buildings available for hospital use, facilities for transporting wounded men, food supply and drug supply on hand and available lists of trained nurses and other persons essential for hospital work, etc., etc.
>
> "3. To aid in the care of the sick and wounded and the elimination of preventable diseases."

In his prompt reply President Wilson stated that the Secretaries of War and the Navy had directed the preparation of a plan for accepting the services of the committee.

With a large reserve of medical officers for the army and the navy, a thorough organization and equipment of military units by the Red Cross, a revivified and federalized militia and an alert Committee of American Physicians cooperating with these bodies, with thousands of self-sacrificing and patriotic doctors and nurses still unenrolled but eager to serve, and with an awakened and enlightened public, medical preparedness ought soon to be more than a slogan! Even now we may at least feel sure that the disgraceful fiasco of the Spanish-American War will not be repeated. W. M. B.

THE NATIONAL BOARD OF MEDICAL EXAMINERS.

The labors of the lamented Wm. L. Rodman in establishing a national board of medical examiners bid fair to bear fruit. The Board, a voluntary organization, selected from the Army, Navy and Public Health Services, the Federation of State Examining Boards, and the profession at large, will hold its first examination in the Army Medical Museum at Washington, beginning October 16th next.

The examination will cover all the branches of medicine. For admission to it are required evidence of the completion of four years high school study and two years of satisfactory college work, graduation from a Class A medical school, and one year's service in a satisfactory hospital or laboratory. A registration fee of $5 is also required.*

A certificate granted by this board is not a license to practice medicine nor does it afford any exemption from the legal requirements of any State or territory. But it seems likely that the time is not far off when certificates granted by this representative body—endorsed as it has been by many of the large medical associations of the country, and enjoying the moral and financial support of the Carnegie Foundation—will be accepted by the various State Boards as ample evidence of qualification for licensure. Certainly the need is very great of a standard license in medicine acceptable in any part of the territory of the United States; and it is earnestly hoped that this volunteer "National Board of Medical Examiners" will soon be replaced by an official National Board, or its equivalent.—W. M. B.

SIR VICTOR HORSLEY.

The daily press brings the sad news that Sir Victor Horsley, one of Britain's great surgeons, recently died of heat stroke in Mesopotamia, where he was on duty as Colonel in the Royal Army Medical Corps.

Horsley's name is linked with those of Krause, Cushing and a few other bold pioneers and brilliant investigators who have developed the modern surgery of the brain and spinal cord, and his fame will rest securely on his important contributions, both clinical and technical, to this difficult and complicated branch of surgery.

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*Further information and application blanks may be obtained from Dr. J. S. Rodman, secretary of the board, 2106 Walnut Street, Philadelphia, Pa.

Surgical Suggestions

A "fistula in ano" opening in the midline in front of the anus should suggest its possible origin from a perineal dermoid cyst.

In distinguishing between subphrenic and hepatic abscess, marked enlargement of the liver downward suggests that the abscess is in the viscus. Subphrenic abscess accommodates itself chiefly by pushing the diaphragm up.

In excising an angioma make the incision large enough and sufficiently far from the growth to permit approach to it from all sides and deliberate ligation of all the vessels feeding it.

Pituitrin (pituitary liquid) is a powerful and reliable stimulant of intestinal contraction. Its use may thus be actually life-saving in dealing with the sometimes threatening post-operative paralytic gut distention that will not respond to enemata or purges. The drug may be injected into the muscles or directly into a vein; and this may be repeated at intervals of a few hours, if necessary. Its action is almost instantaneous.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

Standard Surgical Out-Patient Clinics.

The value of cooperation in clinical work is indicated in the usefulness of the Associated Out-Patient Clinics of the City of New York. Their efforts to coordinate the work of existing dispensary and out-patient departments, to eliminate unworthy applicants for treatment, to promotion of proper standards of treatment, and to further all methods that make for economy and efficiency are most commendable.

In the process of standardizing clinical work, numerous plans have been suggested for specific types of clinics. While most of the advice developed through the investigation of the committees is applicable principally to the organization of clinics in large cities, there is a certain measure of applicability in any institution in any community.

With a view to spreading information with reference to the standards for surgical clinics, it is perhaps advisable to quote the report prepared by the section on surgery of this organization. The careful study by superintendents of dispensaries as well as the dispensary medical boards and surgeons in attendance will undoubtedly suggest many weaknesses in existent systems and stimulate and further the development of better service in surgical clinics.

I. EQUIPMENT OF A SURGICAL CLINIC.

1. Rooms:

The clinic should consist of two units, one for male and one for female patients, each unit to consist of the following:

A separate space for history taking.

One large room for examination of patients and general dressing.

If the number of patients warrant such arrangements—

One operating room for clean cases.

One operating room for infected cases.

One room for the treatment of fractures.

When the two units are in charge of one chief of clinic, one set of operating rooms can be omitted, and in place of these, one recovery room should provided.

Accommodations should be provided for keeping patients in bed for periods of from ten to twenty-four hours.

2. Assistants:

It is desirable that there shall be in attendance for each unit at least two doctors, besides the chief and the first assistant. When the two units are run together, this will give a total of at least six men.

There should be assigned to each unit one nurse to assist with dressings, and a third nurse should have charge of the operating rooms.

3. Laboratory Facilities:

Should be available for the complete anatomical, pathological and chemical examination of excreta, secreta, tissues, etc.

It is recommended that a complete department of this kind be established for the benefit of the entire dispensary and placed in charge of a competent laboratory man.

Provisions for the simpler tests for examination of urine and blood should be available in the dispensary rooms.

4. X-ray Facilities:

Both for photographic and fluoroscopic work.

When the dispensary is connected with a well-equipped hospital, use could be made of the X-ray plant of the hospital but facilities for fluoroscopic work should be at hand in the dispensary rooms in cases in which the X-ray plant is not in close proximity. Facilities for photography should also be present.

5. Facilities for:

Mechano-therapeutics, hot-air treatment and electrical treatment and massage should be available in a separate department.

II. THE KIND OF PATIENTS TO BE TREATED IN A SURGICAL OUT-PATIENT DEPARTMENT.

1. The decision as to whether a case is an out-patient or not should be rendered by the chief of the clinic.

A. Anesthesia:

1. In all cases where possible, local anesthesia shall be used.

2. All cases for anesthesia must first be referred to the surgeon in charge for his examination, or, in his absence, to the first assistant. In all cases in which general anesthesia is used, a suitable recovery room must be provided, and the patient must have the services of a nurse until out of the influence of the anesthetic.

B. Fractures:

1. Ambulatory fracture cases may be treated in the out-patient department, provided open operation is not necessary.

2. The service of a radiographic department to furnish sufficient skiagraphs for the treatment of fractures should be afforded to the out-patient clinic. This department should, if possible, be in close proximity to the out-patient department, in order that fluoroscopic examination may be made, if deemed necessary.

3. There should be available material for splinting fractures, and in addition the services of a competent bracemaker should be secured in cases for which such services may be necessary.

4. There should be, either in connection with the out-patient department or connected with the hospital, and open to patients from the out-patient department, a department of massage, mechano-therapy, hydrotherapy, and hot-air treatment for the treatment of convalescent cases.

C. Operative Cases:

1. The permission of the surgeon in charge, or, in his absence, that of the surgeon designated by him, must be obtained in every operative case.

2. Lumbar puncture for diagnosis and the injection of salvarsan should be performed only in clinics in which facilities are provided for keeping patients in bed for at least twenty-four hours.

3. In those clinics in which the Laryngological Department is under the control of the Surgical Department, tonsils and adenoid cases shall not be operated upon except under general anesthesia, and unless facilities are provided for keeping patients under observation in bed for at least twenty-four hours.

4. Patients that have been operated upon should be visited when necessary, by the visiting nurse, and her records and report attached at once to the history of the patient. An immediate report should be made by the visiting nurse to the operator personally or by telephone, should the nurse, in her judgment, consider it necessary that the patient should be visited by a doctor from the out-patient department, or admitted to the hospital.

III. SOCIAL SERVICE AND VISITING NURSING.

It is desirable that one or more Social Service Workers be connected with the Surgical Department.

Social Service should include:

1. Inquiry into the home conditions of patients.

2. Giving advice on the hygiene of the home.

3. Inquiry into workroom and occupational condition.

4. Elimination of unworthy patients from the clinic.

5. Referring families to relief agencies for studied constructive work, and rendering financial aid in emergencies, especially due to crippled wage-earners.

6. Following up cases recommended for hospital care, urging that such recommendation be observed:

a. Following up cases that require further treatment and return at proper intervals.

b. Following up ambulatory operative cases.

7. Rehabilitation of individuals or families whose need for assistance is in some way due to accident or disease.

8. Enabling patients to obtain mechanical appliances ordered by the doctor, and employment for the handicapped.

9. Visits by nurses to carry out such treatment as shall be designated by the doctor in the out-patient department. The nurse or social worker should be able to call on specifically designated

physicians of the out-patient department who shall be known as Out-Patient Visiting Surgeons, for consultation.

It is well at the outset to state that in out-patient clinics affiliated with hospitals there should be one department for keeping the records of all the patients of the hospital. This department should have a record room equipped with filing cabinets and whatever other accessories may be necessary, and should be in charge of a competent stenographer.

On application to the out-patient department every new patient (and the clerk should be instructed to ascertain carefully whether this patient has ever been treated in any department of the hospital previously) should be given a history sheet stamped with a serial number in order of application, thus making the history sheets more or less in chronological order with reference to the admission of the cases. These histories shall be placed in an envelope marked in different languages, that the envelope and its contents shall not be taken home, nor read nor folded. The patient shall also receive a card, which should always be brought by the patient to the hospital when he comes, bearing his name, age, address, the date first received, the history number, the hours when he is expected to come, and on its back the words "Penalty for False Representation." This card should also be delivered for the patient's keeping in an envelope with instruction not to lose it, and the statement that a fee of ten cents will be charged for the issue of a new card. The record clerk shall also make out a name-filing card along stated lines.

Return patients are given their histories on presentation of their cards at the window. If a patient is referred to another department his history and name file card are so stamped. The same history is used in all departments. No histories shall be removed from the files for other purposes, unless special permission is granted by the proper authority, etc., etc.

Book Reviews

Gynecology. By William P. Graves, A.B., M.D., F.A.C.S., Professor of Gynecology at Harvard Medical School; Surgeon-in-Chief to the Free Hospital for Women, Brookline; Consulting Physician to the Boston Lying-in Hospital. Octavo; 770 pages; 424 illustrations. Philadelphia and London: W. B. Saunders Company, 1916. $7.00, net.

This work is designed both as a text-book and as a general reference book of gynecology. In both designs the author has been eminently successful. In no single volume on gynecology so far published in English has there been such a happy union of the essentials of a good text-book.

The author has happily divided his subject matter under three divisions.

Part I deals with the physiology of the pelvic organs and with the relationship of gynecology to the general organism. This is a distinct advance and must be of great value to gynecologists who treat patients as such, with regard to disease or pathology of organs remote from the pelvis with which however they are to be considered in relation to cause and effect. The facts of importance in this connection are well chosen and arranged and are in accordance with the latest teaching in gynecologic physiology and pathology.

Part II is concerned with a description of the various gynecologic diseases with which the student should be familiarized. Completeness of this part is favored by numerous excellent drawings from microscopic and gross specimens. These are essentially illustrative and are strikingly true.

There is only one thing lacking in this volume to make it complete as a reference book; that is fuller reference to works of other authors with acknowledgment in each case for important advances in clinical observation, in physiology and in pathology. While such references are, to be sure, somewhat cumbersome, their inclusion is a duty which is more or less overlooked by American authors. It is to be hoped that in the next edition of this volume, which is certain to appear in the near future, instead of expressing general indebtedness in the preface, the author will make acknowledgment to the excellent single contributions in medical literature from which he must have drawn his material.

The work is well illustrated, with 303 half-tone and pen drawings by the author and with microscope drawings by Margaret Concree and Ruth Huestis.

The International Medical Annual, *a Year Book of Treatment and Practitioner's Index,* 1916. Thirty-fourth year. New York: William Wood and Company. $4.00, net.

The present Medical Annual is the work of twenty-seven contributors, three of whom are Americans. These are E. Wyllys Andrews of Chicago; Lewis A. Conner and J. Ramsay Hunt, both of New York.

The book covers the entire field of medicine, as in previous years, and does it admirably this year, thanks to the increased zeal and energy of the contributors, who have tried to condense the advances in medicine and surgery into one compact volume so the professional men who are engaged in the various theatres of war may find in it ready and helpful reference. A special section has been added to the Dictionary of New Treatment on Naval and Military surgery. A great and, it may be well said, a successful effort has been made to embody in this book all information the authors have been able to gather that would serve to make the health of the soldier more secure. The methods that have been tried and found useful in dealing with military and naval surgery and medicine have been collected for ready reference by military and naval surgeons engaged in active service who are otherwise out of touch with the ordinary channels of communication which they enjoy in normal times.

While this is the special feature of this year's Annual there are few subjects in medicine or surgery the advances in which have not been included.

Lateral Curvature of the Spine and Round Shoulders. By Robert W. Lovett, M.D., Boston; John B. and Buckminster Brown, Professor of Orthopedic Surgery, Harvard Medical School; Surgeon to the Children's Hospital, Boston; Surgeon-in-Chief to the Massachusetts Hospital School, Canton; Consulting Orthopedic Surgeon to the Boston Dispensary, etc., etc. *Third Edition;* Revised and Enlarged. Octavo; 213 pages; 180 illustrations. Philadelphia: P. Blakiston's Son & Co. $1.75 net.

In this revised edition Lovett gives ample space to the discussion of the treatment of scoliosis by forcible correction. The method of forcible over-correction as advocated by Abbott, arousing as it did so much attention in the past few years, is gone into fully. Lovett has come to the conclusion that this method must fail of permanent good results because it is in conflict with our knowledge of the pathology of this peculiar affection of the spine. The results in the treatment of scoliosis as previously reported by him seem now to compare so favorably with those of other advocated methods that Lovett has fallen back on his own personal experience. The book contains excellent illustrations of various phases of the disease as occurring in his own practice, including a number of roentgenograms, the great value of which receives special emphasis. A chapter on the history of scoliosis has been added in this revised edition. This, according to the author, has been incorporated because "there seemed to be nothing in English on the subject." The little book is without doubt the most complete and most up to date monograph on scoliosis contributed to English medical literature.

Traité de Gynécologie. Par Forgue et Massabuau, professeurs à la Faculté de médecine de Montpellier. Octavo; 928 pages; 283 illustrations. Paris: J. B. Baillière et fils, 1916. 25 francs.

This volume is published as part of "Traité de Chirurgie," issued under the direction of Professors A. Le Dentu and Pierre Delbet. The two collaborators have succeeded in collecting the data essential in a complete work on gynecology. Without any preface or introduction the book begins with methods in gynecological examination. It then takes up each genital organ from the external to the internal and details diseases in categorical fashion in the accepted style of most text-books.

While making a massive reference book it is not exactly up to date. We note an absence of practically all the advances in gynecologic pathology and surgery that have been made in the past four years. References to medical literature still limit themselves to the year 1912. As a record of our knowledge in this special branch of surgery and medicine till 1912 the book may be said to be very complete, well illustrated and well worthy of a place as a reference.

The Kinetic Drive: Its Phenomena and Control. By George W. Crile, M.D., Professor of Surgery, Western Reserve University; Visiting Surgeon to the Lakeside Hospital, Cleveland. Octavo; 71 pages; illustrated. Philadelphia and London: W. B. Saunders Company, 1916.

This little book contains the Wesley M. Carpenter Lecture delivered by Dr. Crile before the New York Academy of Medicine in 1915. It sets forth briefly Crile's views as to a mechanistic conception of life in the study of both normal and pathologic processes; "and it suggests a philosophy of life by means of which self-preservation may be secured through kinetic control."

Though one may not fully agree with the various views set forth by the author, one cannot but admire his clever exposition of the subject and the interesting manner in which emotions and disease are shown to be related. The book is illustrated with several excellent photomicrographs.

Diseases of the Skin. By Richard L. Sutton, M.D., Professor of Diseases of the Skin, University of Kansas School of Medicine; former Chairman of the Dermatological Section of the American Medical Association, etc., etc. Octavo; 916 pages; 603 illustrations and eight colored plates. St. Louis: C. V. Mosby Company, 1916.

The student and practitioner will find in this book a most excellent and comprehensive treatment of the subject of dermatology. No efforts have been spared to make the book attractive as well as useful, and the profusion of photographic reproductions is remarkable. The various diseases of the skin are treated in concise manner, special emphasis being laid on pathology and therapy. Following the description of each disease will be found a list of the most important references concerning it in the English, French and German literatures. Besides the skin itself, the author takes up separately lesions of the hair, nails, sebaceous and sweat glands, and the mucous membranes adjoining the skin. Excellent pictures of many of the rare tropical diseases are presented.

Altogether the work may be highly recommended as a well written comprehensive text-book of dermatology.

The Catarrhal and Suppurative Diseases of the Accessory Sinuses of the Nose. By Ross Hall Skillern, M.D., Professor of Laryngology, Medico-Chirurgical College; Laryngologist to the Rush Hospital, Philadelphia, etc. *Second Edition.* Octavo; 417 pages; 287 illustrations. Philadelphia and London: J. B. Lippincott Co., 1916. $5.00.

This is a thorough and logical handling of a most difficult subject, entirely from the viewpoint of the practitioner.

The first part of the book, under the heading of "General Considerations," deals with the surgical anatomy and the physiology of the sinuses and the pathology of accessory sinus disease, together with its sequelæ and complications. The methods of making an examination and of reaching a diagnosis are gone into in detail.

The subsequent chapters take up the individual sinuses more completely and go over much of the ground covered in the "General Considerations." This makes for repetition; but, as the author states in his preface, it tends to impress important facts upon the reader.

Altogether it is an excellent work both for the general practitioner and for the specialist.

Progress in Surgery

A Résumé of Recent Literature.

The Significance of Syphilis in Obstetrics. Wm. D. Fullerton, *American Journal of Obstetrics.* July, 1916.

The suggestions for minimizing the effects of syphilis from an obstetrical viewpoint are given by the author as a summary of his experience and conclusions. All physicians practising obstetrics should in his opinion become familiar with the signs and symptoms of syphilis in the placenta, fetus, and young children, as well as with the suggestive histories of the parents of such children. The history of every pregnant woman should be taken as early as possible in her pregnancy, and special emphasis should be laid on her past history relative to evidence of infection, such as genital sore, rash, sore throat, abortions, miscarriage, premature labor or the birth of children dying in early childhood or living with evidence of the disease. Whenever infection is in the least suspected, the patient should be carefully examined for evidence of the disease and a Wassermann test made. In such cases the husband should also be examined, and if found infected, he should be treated.

Every new-born child should be examined and watched for evidence of infection. Every placenta should be weighed, examined microscopically, and at least a freshly tested specimen examined microscopically for evidence of the disease.

Especially in all obstetrical clinics, including both hospital and out-door services, the same precautions should be taken, and the careful examination of every placenta, both fresh and sectioned, should be a part of the routine laboratory work. Special staining for the treponema should be done whenever infection is strongly suspected, and thorough autopsies, whenever available, would be most instructive.

Every patient showing evidence of the disease either before or after labor, should be impressed with the importance of continued treatment. Charity cases should be referred to a free dispensary for treatment, and if they do not report regularly the visiting nurse or social service workers should exert their influence, enforced if necessary by civil authority, to compel these patients to take treatment.

Report of a Case of Carcinoma Uteri Treated According to the Percy Method, with Autopsy Findings.

Frederick W. Bancroft, *American Journal of Obstetrics*, July, 1916.

The findings in Bancroft's interesting case as summarized by him are as follows: Certain islands of cancer cells show advanced degenerative changes, reaching in many instances stages of necrosis and dissolution. Other show milder grades of degeneration, and still others have apparently not been affected by the treatment. The latter cells have all the appearance of viable carcinomatous structures, but concerning the ultimate fate of even these well-preserved cells he does not wish to commit himself. The author also calls attention to the fact that the Percy operation is attended by a mortality in a certain percentage of cases. The author's patient died with symptoms of a severe toxemia similar to that as reported from radium treatment of cancer of the womb.

Acidosis Complicating Pregnancy, with Report of a Case Cured by Transfusion.

Albert H. Ely and Edward Lindeman, *American Journal of Obstetrics*, July, 1916.

The authors report a case of repeated severe vomiting by a woman in her second pregnancy, with acetone and diacetic acid as constant findings in the urinalysis. The successful treatment of this serious condition was brought about by transfusion with the syringe method. The rather novel and ingenious plan of administering alkalies in large amount to the donor twenty-four hours before the transfusion, was carried out. 1100 c.c. of blood with 300 c.c. of Lock's solution were poured into the recipient's circulation. According to the author's expression of opinion the result was "miraculous"; the patient made a remarkable recovery.

[There are a number of points in the report about which questions must be raised. The reader who is interested should see the original article before trying the procedure in his own cases.]

A Report of Three Cases of Labor Following Ventral suspension.

Wm. E. Caldwell, *American Journal of Obstetrics*, July, 1916.

Caldwell believes there should be no deliberate fixation in the child-bearing woman without sterilization. The three cases reported by him are illustrative of some of the serious after-effects both as to disturbance in functions and, worse still, danger to life of the patient in the event of future pregnancies that go to term. The three cases reported by him ended in death, due to rupture of the uterus in one case, severe infection in another, and in the third to adhesions binding the sigmoid and intestinal coils to the abdominal wall.

The Etiology of Uterine Prolapse and Cystocele.

Gibbon Fitzgibbon, Dublin, *Surgery, Gynecology and Obstetrics.*

Fitzgibbon gives a detailed description of the pelvic fascia as it leaves the abdominal parietes at the white line marking the rami of the pubes to form a sling to support the pelvic viscera, chiefly the bladder and the uterus. The "endopelvic" fascia he claims is the true supporting membrane of these two organs. Prolapse of the uterus and cystocele are due to damage of the pelvic fascia in the region of the lateral fornices and in front of the cervix. Prolapse of the uterus may, however, exist without the presence of a cystocele. According to the author's theory, laceration of the perineum and levator ani muscles cannot be responsible for the production of prolapse. When there is the primary defect, it allows for an increase of the cystocele. Prolapse and cystocele are analogous to abdominal hernias through scars, due to defective union of the fascia. The cure of the condition can therefore be effected by reuniting the fascial diaphragm across the pelvis. This can be repaired without interfering with the function of the uterus or dislocating the bladder. Atrophy of the uterus has no influence upon its support; hence amputation of the cervix other than the removal of an hypertrophied lacerated vaginal portion is not necessary.

Subluxation of Radial Head.

C. A. Stone, St. Louis, *Journal of the American Medical Association*, July 1, 1916.

Stone reports a case of subluxation of the head of the left radius in a child while being pulled across the floor in play. Flexion of the forearm was painful and supination was especially so, but in one of the attempts the dislocation was reduced suddenly and motion was free and painless. The following summer the subluxation recurred in the right elbow, but ceased in the same way. It occurred still again on the left side in May, 1915, and ended similarly. In going over the clinical records available to him, for the past five years, Stone found no similar account of subluxation in over 14,000 surgical and orthopedic cases. Most of the accounts came from German and French surgeons, 400 cases having been reported prior to 1889. Van Arsdale reported 100 cases in that year and gave a complete bibliography. The causation and pathology are discussed and Stone reports his experiments in producing the dislocation on the anatomic material of the Washington University Medical School. In every instance the bones were practically free from muscles, but the ligaments were intact. While trying forcible traction on the first arm the annular ligament could be seen to spring inward, but on attempting powerful adduction, the external lateral ligament ruptured. Of the remaining eleven elbows a subluxation of the radial head was produced in six. In each of these six cases the annular ligament always slipped over the head when the hand was pronated. One case with the hand in this position resulted in failure. In the remaining four cases, the ligament tore during traction while the hand was supinated. Stone finds a slight difference in the diameter of the radial head from that given in the textbooks, where it is always described as round. The longest diameter is always in the same sagittal plane as the interior portion of the tuberosity of the radius. The explanation for the lesion occurring in the hand pronated is as follows: Anteriorly, from the neck of the radius to the head the rise is an abrupt one. Any traction with the hand supine pulls the ligament against this. Laterally and posteriorly, the ascent is quite gradual, so that in pronation the ligament lies over this part and is stretched until it suddenly slips over the head. The conclusion is that subluxation of the head of the radius can occur while the biceps is contracted with the forearm flexed and without adduction, while the hand is pronated. Suppination is resisted because the tense lateral ligament forces the flattened side of the radial head against the anterior edge of the lesser sigmoid articulation and the inner attachment of the annual ligament. Attempts at this motion throw the exposed two-thirds of the long axis of the head against an already tight ligament, increasing the tension. Complete pronation is possible because the short part of the long axis is behind and moves outward against the loose posterior portion of the lateral ligament.

Fracture of the Os Calcis.

Benjamin F. Lounsbury, *Surgery, Gynecology and Obstetrics*, June, 1916.

Fracture of the os calcis has occurred in 21 cases out of 1,000 cases in the author's experience, making the percentage 2.1. This he claims is far more frequent than is generally supposed. The reason for the former belief in the variety of this fracture was lack of routine roentgenography. Owing to the disability that results from fracture of the heel bone when overlooked and improperly treated, it is well in every case of so-called sprain of the angle or severe injury of the foot to *x*-ray the affected part. Frequently this fracture may be the underlying injury.

In tear fractures the author advises suture with kangaroo tendon followed by immobilization with relaxation of the muscles of the calf and the plantar fascia and muscles.

Tuberculosis of the Superior Maxilla. Rafaele D'Alise, *Annale di Odontologia*, February, 1916.

Reports two cases. Primary tuberculosis of the mouth is unusual, that of the superior maxilla being especially infrequent. Carious teeth and the trauma incidental to their extraction furnish the avenue of entrance for the tubercle bacilli.

In individuals predisposed to tuberculosis the resistance of the tissues is lowered by tooth decay and a favorable site for the infection is established.

Streptococcus Mucosus Capsulatus Infection of the Mastoid Bone. Robert L. Loughran, New York. *The Laryngoscope*, June, 1916.

After a short résumé of some of the literature covering the bacteriology of the organism the author reports three cases of mastoiditis in which streptococcus mucosus capsulatus was the infecting agent.

He calls attention to the extreme virulence of the organism and the marked destruction of tissue, both soft and bony, in the cases in which it is found. The prognosis is always grave inasmuch as the symptoms, in the beginning may be insignificant though there is already extensive involvement of important structures. There is—the author quotes Whiting—the development of a most dangerous and insidious latent period which may justly occasion apprehension concerning the outcome of any inflammatory ear disease which has its origin in the activities of this infective agent.

Sarcoma of the Scapula; Histological Diagnosis Made by a Study of Blood Aspirated from Pulsating Portion of the Tumor. C. E. Royce, *Surgery, Gynecology and Obstetrics*, July, 1916.

About 10 c.c. of blood withdrawn from a pulsating tumor of the scapula, clinically diagnosed as sarcoma, were permitted to stand overnight at room temperature. Formalin 10% was added to the clotted blood. The following day a portion of the clot was removed and imbedded in paraffin and examined. Sections of this stained with hematoxylin-eosin revealed beautiful pictures of islands of sarcoma cells imbedded in a matrix of fibrin and red cells. The cells were of the small round variety showing numerous mitotic figures.

Disinfection of Septic Joints. F. J. Cotton, Boston. *Boston Medical and Surgical Journal*, June 1, 1916.

Cotton believes that the knee joint has a far greater resistance against infection than is generally believed. He holds that drainage of the joint for any purpose is almost a crime. Patients upon whom this procedure is practiced do badly, not because of the sepsis arising from the joint, but from infection in the muscle and fascia planes in the thigh. Cotton has obtained splendid results in septic joints from thorough washing out of the joint through an incision with 1-15,000 bichloride solution, followed by salt solution and *tight closure* of the joint. Cotton reports seven cases.

Gas Gangrene in the Present War. M. Weinberg, Paris. *The Glasgow Medical Journal*, April, 1916.

The author, who had been deputed by the Pasteur Institute to make a study of gas infections, gives the results of his researches. Gas gangrene is a usually rapidly fatal infection. It is caused by a number of different organisms, among which bac. perfringens is the most common. The gangrene of the limb is not a necessary feature of gas infection. In such cases numerous wide incisions of the wound area may save the patient's life. The gangrene is probably due to shutting off the blood supply, either by severing of the arteries or by thromboses. In cases where gangrene has occurred the organisms forming gas seem to thrive especially well, hence the resulting picture of gas and gangrene.

The flora of gas gangrene is the same as that of almost every wound, and on the other hand, a wound may become, sooner or later, sometimes even a very long time afterwards, the starting point of a grave gaseous infection. It is, therefore, evident that every good treatment of wounds is a preventive treatment of gas gangrene. The wound, to be well treated, must be treated with the least possible delay. It must be laid open as widely as possible, foreign particles must be cut away and all fragments of bone must be removed. In the case of gangrene of a limb amputation is always necessary.

Sera and vaccines would appear to be beneficial, but they are extremely difficult to prepare.

Roentgen-Ray Diagnosis of Gas and Pus Infections as Complications of Wounds with Deeply Buried Bullets or Shell Fragments. George G. Davis, *Surgery, Gynecology and Obstetrics*, June, 1916.

It is a routine procedure at the Twenty-third General Hospital from which this report is made, to roentgen-ray all bullet or shell wounds when the missile is suspected of remaining within the body. The characteristic finding in the shadowgraph is a halo-like shadow encircling the bullet. This is due to an abscess cavity which in the majority of cases is a bacillus aerogenes capsulatus infection. In more extensive infections which undermine muscle planes there are radiating pale shadows going up and down and in all directions from the bullet halo. When this shadow is found it is taken as an urgent indication for operation.

The Action of Gamma Rays of Radium on Deep Seated Inoperable Cancers of the Pelvis. H. Schmitz, Chicago, *Medical Record*, July 15, 1916.

The therapeutic action of radium depends on the use of a correct technique, which must be based on a careful physical examination of the patient and the physical properties and the biologic action of the metal.

The use of massive Roentgen rays, according to multiple field and crossfire methods in conjunction with radium therapy to destroy metastases, is an imperative necessity.

Certain surgical procedures must be used in radium therapy to assist the action and facilitate the application of the rays.

The action of gamma-rays on cancer tissue is specific and suggests positive proof of the possibility of destroying malignant tumors by the application of radium.

The results of radium therapy in inoperable and recurrent cancers surpass those of any other known therapeutic agent.

The prophylactic use of radium rays in operable carcinomata increases the percentage of operability and probably the efficiency of the operative procedures.

Pelvic Varicocele. J. Alvarado Wall, *Surgery, Gynecology and Obstetrics*, July, 1916.

The symptoms of pelvic varicocele are not well defined as a rule. Pain in the lumbar region and in the lower part of the abdomen, aggravated on standing, during and just before the menstrual period, subsiding when the patient lies down and when the flow is well established, without any other physical findings to account for it is very suggestive of a pelvic varicocele. When in addition there are varicosities in the lower extremities and in the labia together with the physical finding of a "swollen flaccid" mass in the cul-de-sac of Douglas the diagnosis may be made with fair amount of certainty. Care should be exercised when searching for the varicocele during operation to keep the patient flat, as the Trendelenburg posture tends to make the varicocele disappear. The condition is more frequent, according to Wall, than is commonly supposed.

Excision Versus Gastro-Enterostomy. *Van Buren Knott, Surgery, Gynecology and Obstetrics*, July, 1916.

In view of the fact that statistics from large clinics all point to the great frequency of cancer of the stomach developing upon an old ulcer basis, according to Knott in 70% of cases, the author urges that wherever feasible and possible the ulcer-bearing area should be excised by whatever method may be deemed most safe and practical. Gastro-enterostomy should supplement this operation in the event of a pylorectomy being necessary to get rid of the extensive ulcer, or where adhesions are present and constriction is present or feared. Gastro-enterostomy alone cures about one-third of the cases, a second third of the cases have recurrence of symptoms while the last third develop cancer of the stomach within two to five years. This experience of Moynihan's is corroborated by Knott and should serve as a warning against doing the simple gastro-enterostomy for the permanent cure of ulcer of the stomach.

The Treatment of Exophthalmic Goiter (Basedow's or Graves' Disease). By Means of the Roentgen Rays. George E. Pfahler and J. Donald Zulick, Philadelphia. *The Pennsylvania Medical Journal*, June, 1916.

After a very complete review of the literature of the subject, the authors point out that although many cases of exophthalmic goiter have been treated by Roentgen rays, conclusions as to the efficacy of the treatment are risky owing to the great variability in the technic employed.

The authors believe that the x-ray has a field of distinct usefulness in the treatment of this form of goiter. A preliminary roentgenogram of the chest should be made in all cases in order to obtain some information as to thymic size and as to substernal extension of the goiter. When the thymus is not found enlarged, a single dose directed through the sternum will be sufficient. When it is enlarged, the rays should be passed through two fields on either side of the median line below the clavicles, including the first, second and third spaces. The dosage must be carefully regulated so that the total amount given the patient is known. The series decided upon should not be repeated inside of three or four weeks. Sometimes it is advisable to divide the treatment so as to give a dose through only one or two fields at a time. After there is a distinct improvement in the symptoms, the interval should be prolonged, for there is danger of reducing the secretion of the gland to the extent of producing the symptoms of hypothyroidism.

The authors conclude their study as follows:

"We believe that the trial of treatment for one series with an interval of waiting of one month is justifiable in all cases, for if operation is decided upon nothing is lost, and many operations in this way can be avoided.

"Treatment should be directed toward both the thyroid and the thymus glands.

"An increase in weight and a decrease in pulse rate are the first signs of improvement and are practically always found.

"Treatment must not be prolonged over too great a period or hypothyroidism may be produced.

"The goiter and the exophthalmos are the last to show improvement, and in many cases show no change."

Observations in the Diagnosis and Treatment of Brain Injuries in Adults. Wm. Sharpe, New York. *Journal American Medical Association*, May 13, 1916.

Sharpe notices the high mortality of brain injuries and their neglect in the general hospital on account of the recognized hopelessness of the condition. He combats the notion that brain injuries following fracture of the skull get along just as well without operation as with it. This, he holds, is true if the operation has been delayed until they reach the dangerous stage of medullary compression or even the later stage of medullary edema. An early operation is advisable not only as a means of saving life, but also to lessen the danger of post-traumatic conditions which are, he believes, due to the resulting unrelieved intracranial pressure prolonged over several weeks or more. During the past three years he has examined personally and treated 282 adult patients having one or more traumatic lesions of the brain. Of the 239 recent acute conditions, seventy-nine patients were operated on, and of the forty-three old chronic injuries, twenty required surgical treatment. He reviews the symptoms that guide the surgeon and the other treatment. It is in fractures of the base that there has been the greatest difference of opinion as regards operation, and until recently it has only been realized that the fracture itself is of less consequence. It is the resulting hemorrhage and edema that are the dangerous complications of basal fractures. Decompressive operations, therefore, are advisable. In his seventy-nine patients operated on he has been impressed by the absence of extradural and middle meningeal hemorrhage unassociated with subdural lesions, which he thinks is a more uncommon condition than our textbooks would lead us to believe. In the great majority of cases many of the important guiding or localizing symptoms are absent and in that case if there are any signs of increased pressure in the skull, early subtemporal decompression is advisable. It is rarely possible to observe the fundal signs of choked disc within six hours after the injury and the signs of shock often overshadow or prevent the signs of increased intracranial pressure. It is poor surgery to operate on patients in such shock that the pulse rate is greater than 120 and any operative procedure for the relief of pressure should be undertaken while the pulse rate is descending at 60 or below. If this fall does occur and the pulse rate begins to rise rapidly, he has yet to see a patient recover. Repeated lumbar punctures at times are of great value in lessening the intracranial pressure, but if the intracranial pressure is very high there is danger in this for fear of medullary choking in the foramen magnum, though not as great as in tumor cases. Changes in the reflexes are interesting in these cases according as to the side on which they occur. The Roentgen rays are of little importance in fractures of the skull. The fracture is really the unimportant factor and it may allow the escape of blood and fluid so as to lessen danger. In conditions of gunshot and stab wounds of the head, as in intraperitoneal wounds, if the subdural cavity has been entered, it is advisable to enlarge the opening in the vault and a subtemporal decompression is advisable if the pressure is high. Sharpe says that it was surprising to note the high percentage of post-traumatic conditions in the patients discharged as cured, and he believes that decompression would relieve many of them, or at least stop the progression. The most satisfactory operation for brain injuries is the subtemporal decompression, that is, the bone underlying the temporal muscle is rongeured away to a diameter of from 2 to 3 inches and the dura opened so that escape of subdural blood and cerebral spinal fluid may occur. All depressed fractures of the vault should be elevated and removed for fear of later complications.

Mayer's Solution. A Non-Caustic Hypochlorite Douglas Stewart, New York: *New York Medical Journal*, July 15, 1916.

Mayer's solution may be termed officinally Liquor Magnesii hypochloriti, and was advocated as a cheap and useful antiseptic. Stewart confirms these contentions after a rather extensive use and suggests a simpler method of preparing the solution. Five parts of calx chlorinata, ten parts Epsom salts, and a heavy microscope slide are wrapped up in a single layer of gauze, dropped into a hundred parts of vinegar and allowed to stand an hour. One of the strong advantages of this solution is its deodorizing power, especially for smelling feet or septic vaginae. It is non-irritating to the skin.

Tubal Sterilization. Alfred Heineberg, Philadelphia. *New York Medical Journal*, July 15, 1916.

Heineberg reports two cases of pregnancy despite a bilateral salpingectomy for inflammatory disease of the adnexa. Based upon his experience and a study of the literature, Heineberg offers the following conclusions:

1. There is no method of tubal sterilization which affords absolute security against conception.
2. Simple ligation of the Fallopian tubes with either single or double ligatures has been followed by the largest number of unreported failures.
3. Excision of a wedge-shaped section from each cornu of the uterus, followed by careful closure of the opening with musculomuscular seroserous sutures has yielded better results than any other method.
4. In the light of our present knowledge it seems unwise to advocate any other method than cornual resection.

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THE VALUE OF MICROSCOPICAL EXAMINATION OF ALL TISSUES EXTIRPATED IN THE COURSE OF ROUTINE GYNECOLOGICAL SURGERY.*

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I wish to call attention to a certain phase of gynecological work, the value of which I believe is not generally appreciated. I refer to the routine microscopical examination of all tissues extirpated at operation. To those who are making microscopical examinations of all tissues removed, the cases cited here will no doubt appear commonplace and worthy of but little consideration. To the large number of operators, however, who never examine a specimen microscopically unless perhaps it is large or at least grotesque, they should prove of considerable interest.

The cases utilized for illustration, were selected out from considerably over seven hundred operations done in the Charity Hospital gyneclogical service of which Dr. S. M. D. Clark is in charge and with which I am connected. The particular cases selected were singled out especially with the idea of showing clearly the value of routine microscopical examinations, from the standpoints of accuracy in diagnosis and record keeping, prognosis, and treatment.

Personal conviction as to the positive value of routine microscopical examination was arrived at, in great part, as a result of the careful study of over eight hundred pieces of tissue, taken in one year, from patients who were also carefully observed from every other angle. It was quite evident from this study, that while at times an accurate diagnosis could be made from the gross tissue alone, in many cases it was absolutely impossible to make a final diagnosis with any degree of certainty, without the assistance of the microscope. In some instances, where the gross specimen seemed to indicate plainly the exact pathological condition, the microscope proved the diagnosis to be absoluetly incorrect and at times positively tragical in its possible consequences. Naturally, with these observations has come the realization that routine microscopical pathology must assume an important rôle in the intelligent practice of surgery.

ILLUSTRATIVE CASES.

In the first case selected as an example, No. G. 15-73, the gross tissue might very well have been taken for an enlarged uterus with chronic metritis or fibrosis. One of these diagnosis would probably have gone down in the records and would have been utilized possibly many times over, if statistics on the subject were required. As a matter of fact, the histological examination revealed quite a different picture, and the records show accurately, that the uterus was the seat of a typical adenomyoma and not of a chronic metritis or fibrosis (Fig. I). From the standpoint of accurate, intelligent, comprehensive analysis of the case, no possible number or varieties of examinations previous to operation, no possible refinements in technic or post-operative care, could ever make up for the neglect of microscopical examination.

An instance of how reliance on gross findings alone could have proven positively ruinous to the patient, as well as a source of deep mortification to the surgeon, is seen in case No. G. 15-94. The signs and symptoms in this case were so palpably those of an incomplete abortion, that this diagnosis was made without hesitancy, in spite of the fact that the woman denied absolutely the possibility of recent pregnancy. At the time of curetting, which was required on account of excessive bleeding, the diagnosis seemed to be definitely established, on account of the removal of several pieces of tissue which appeared to be unquestionably placenta. The routine microscopical examination in this case proved, as shown in Fig. II, a chorionepithelioma. If the diagnosis from the gross tissue alone had been relied upon, the records of the case would have been inaccurate and false, the woman would have been allowed to get up in five days and to go home in seven, and she probably would have died shortly afterward, from rapid metastases. In the meantime, besides all this, the surgeon would have been basking in a fool's paradise, secretly if not openly rejoicing at his remarkable cleverness in discovering that a certain widow had juggled with the truth. The routine microscopical examination prevented all this and besides gave the woman a chance for her life. She survived an extensive Wertheim hysterectomy and when last heard from was still well. This case illustrates beautifully how at times the surgical treatment depends absolutely on the routine microscopical examination.

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*Read at the meeting of the Louisiana State Medical Society, April, 1916. Illustrated with autochrome photomicrographs.

Of unusual interest because it involved the ever-present cancer question was case No. G. 15-75. The patient was a woman over sixty years of age, whose uterus was retroverted, large, soft and boggy. She had passed the menopause sixteen years and complained of a profuse leucorrhea. The cervix gave no indication of the cause of the presenting symptom and on account of the uterine displacement, which was difficult to correct, examination of the fundus revealed little more than did that of the cervix. The presence of pus in the fundus could be readily determined, but even after removal of the uterus, section of the gross specimen did not definitely prove that carcinoma was absent. The gross evidence was certainly against carcinoma, but an accurate, dependable prognosis could not be made with certainty, until the microscopical examination demonstrated the presence of a chronic metritis, without carcinoma (Fig. III).

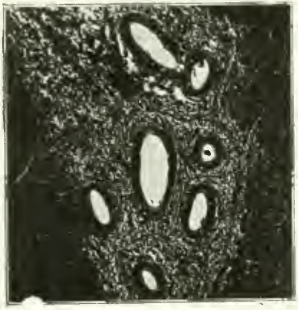

Fig. I. No. G 15-73. Section from a symmetrically enlarged uterus, showing an extensive island of typical uterine glands and stroma. The surrounding smooth muscle fibres can be plainly seen on either side.

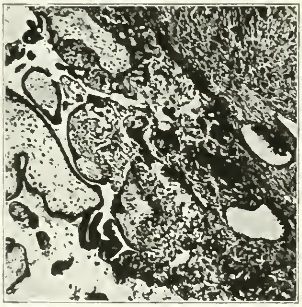

Fig. II. No. G 15-94. Section showing villi with atypical proliferating, Langhans cells, invading underlying structures.

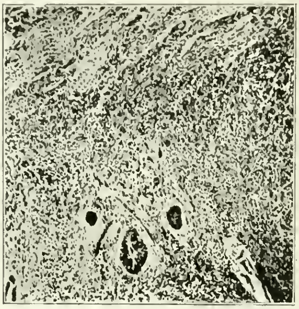

Fig. III. No. G 15-75. Section from uterine wall, showing extensive lymphoid and plasma infiltration, but no evidence of malignancy.

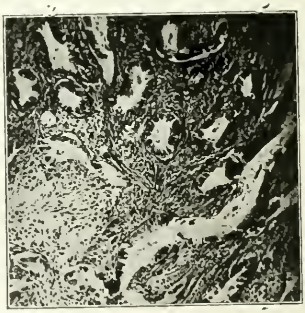

Fig. IV. No. G 15-156. Section from uterine muscle, showing extensive glandular invasion. The glands are numerous, dilated and tortuous. The epithelium is atypical and many mitotic figures can be seen.

An equally interesting example entering in the same category as the preceding case was found in No. G. 15-156. This patient was brought to the hospital on account of excessive, intermittent hemorrhages which had lasted over a period of two years. She was twenty-eight years of age, and while in fairly good physical condition, she showed evidence of considerable loss of blood. The cervix was somewhat larger than normal and its consistency was exceedingly dense. Apart from the extreme induration, there was no objective suggestion whatever of malignancy. This woman had been previously curetted without permanent result, and the operator reported that a distinct obstruction was encountered in the cervical canal. At the second operation, the same obstruction was again encountered at about the level of the internal os, and the idea of curetting for diagnosis was abandoned. The conclusion was that we were dealing with a polypus which could not be readily removed with a curette. Even though the examination of the fundus and adnexa revealed nothing abnormal, panhysterectomy was decided upon on account of the history, the patient's age, her general condition, and the findings on cervical exploration. It was decided to remove the cervix "on suspicion." Not that malignancy was thought to be present at the time, but because it was believed a good prophylactic measure against it. Section of the gross specimen revealed again the hard "fibrous" cervix. The fundus also was somewhat harder than normal, but otherwise showed nothing of note. The endometrium revealed nothing startling except that springing from it at the internal os and obstructing the latter, was a definite polyp about the size of an almond, firmly attached by an indurated base. This was apparently the only cause of the hemorrhage. Routine microscopical examination established the fact that we were dealing not only with an adenocarcinoma infiltrating the entire fundal musculature, but also that this infiltration had already invaded to a certain extent the cervix, which was removed purely "on suspicion." Had the gross findings alone been depended upon, or this woman would have been promised certain freedom from recurrence of hemorrhage as well as permanent pelvic good health. As it was, the routine microscopical examination allowed us to warn both the husband and physician of the probability of recurrence. Without the microscopical examination we probably would have felt that we had been somewhat radical in doing a panhysterectomy for nothing but a small polyp and a fibrous cervix. As a result of the routine examination, we had definite proof that we erred on the side of conservatism and that the operation the woman should have had was a radical Wertheim panhysterectomy. Section from the fundus in this case is shown in Fig. IV. This patient has just returned for examination six months after operation, and there is a beginning recurrence in the vault.

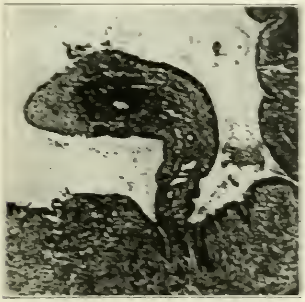

Fig. V. No. G. 15-[illegible]. Section from hematosalpinx [illegible] which no fetus was found. A number of pseudo-decidual cells are seen, especially under the epithelium of the fold projecting into the lumen of the tube.

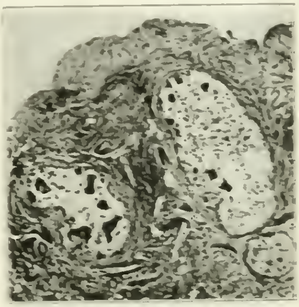

Fig. VII. No. G. 15-218. Section showing [illegible] surface of tube. Several dilated [illegible] vessels are seen [illegible] with breaking down carcinomatous cells.

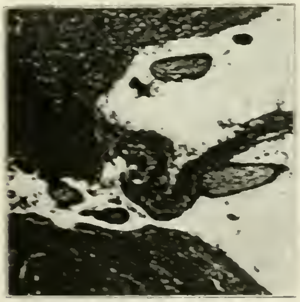

Fig. VI. No. G. 15-[illegible]. Section showing decidual cells [illegible] a clot recovered from a ruptured hematosalpinx shown in Fig. V.

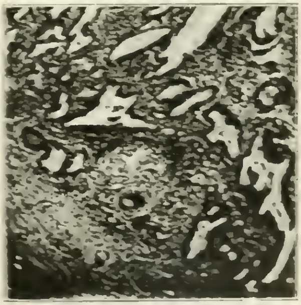

Fig. VIII. No. G. 15-122. Section [illegible] showing [illegible] with a large well-defined [illegible]

From the standpoint of accuracy in diagnosis and record-keeping, especially, the group of cases comprising early tubal pregnancies is worthy of more than passing attention. In view of the unusual amount of interest manifested in this condition as shown by the literature, we do not feel justified in recording for statistical purposes an early tubal pregnancy as such, unless the diagnosis is absolute. The mere presence of a hematosalpinx we do not feel is sufficient evidence of tubal pregnancy, as this condition admittedly may exist independently of tubal pregnancy. In the absence of a fetus, the hematosalpinx must be accompanied by one or more of the three absolute evidences of pregnancy—true decidual cells in the uterine scrapings, tubal or pseudo-decidual cells in the tube (Fig. V), or finally, tubal decidual cells and villi, together or singly, in the clot recovered from the tube or from the abdominal cavity (Fig. VI). This insures a certain degree of accuracy which is impossible without routine microscopical examination.

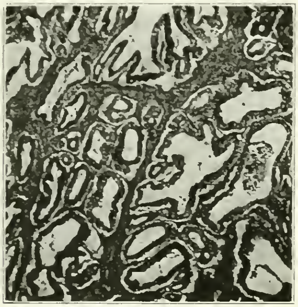

Fig. IX. No. G 15-252. Section of more solid portion of paillo-adeno-carcinoma of ovary, showing the widespread glandular arrangement.

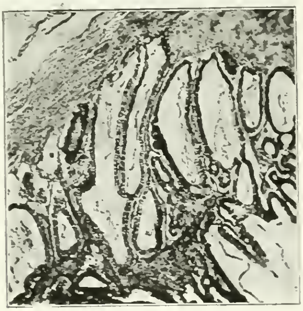

Fig. X. G 15-252. Section of large, unilocular cyst wall forming part of tumor shown in Fig. IX, showing the same histological characteristics as the more solid portion of the growth.

Recently, a rather unusual condition presented itself, in that it was thought that tubal tuberculosis was coexistent with a known cervical carcinoma. The gross evidence in the tubes was so convincing, in spite of the improbability, that there seemed to be almost no room for doubt. The condition was bilateral, the fimbriated extremities were open, the tubes were very much thickened and adherent, and their entire surface was studded with discrete, rather hard, miliary "tubercles." To complete the picture, on squeezing the tube, a considerable quantity of cheesy, thick, yellowish material exuded. Certainly the possibility of tubal metastatic carcinomatosis had to be admitted, but the gross evidence was too much against it for serious consideration. It took but a few moments for the microscopical examination to shatter our erroneous conclusion and to explain at the same time the marked simulation to tuberculosis. Section of the tube for microscopical examination showed plainly that the "miliary tubercles" on the surface were simply breaking down metastatic foci. The fact that these foci were discrete and simulated tuberculosis, was explained by the evidence, as shown in Fig. VII, that we were dealing with a peri-tubal, lymphatic metastasis.

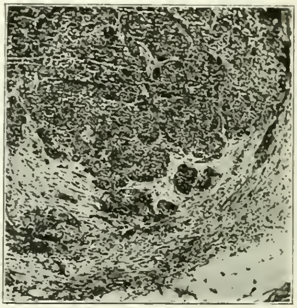

Fig. XI. No. G 15-77. Showing portion of well circumscribed carcinomatous nodule, situated in the parametrium, over an inch away from the cervix.

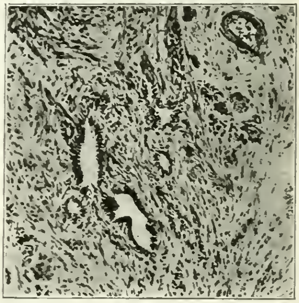

Fig. XII. No. G 15-95. Section from ovary, showing several glands, lined with a single layer of moderately tall columnar epithelium. Aside from the presence of a few such glandular islands, the ovarian tissue in the field is not abnormal.

Some time last year, a very stout, robust, short-coupled individual who was referred for examination, stated that she had missed her periods over ten months. At the beginning she was thoroughly convinced that she was pregnant. This belief was strengthened considerably by the assurance of her physician when she had missed four months, that questionably this was the case. When the time for delivery came and went without even the slightest simulation to labor or the appearance of a fetus, the woman became apprehensive and some time later began to develop definite pain in the lower abdomen. The uterus at the time was but vaguely palpable on account of the fat abdominal wall, and appeared to be slightly enlarged. The adnexa were not distinctly palpable, but were sensitive to deep pressure. The temperature range was between 98° and 101.8°. The white blood cell count was 8,900, the neutrophiles 70% and the lymphocytes 26%.

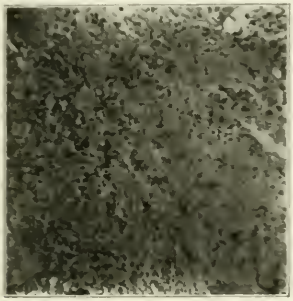

Fig XIII No. S 14-361. Section from a mass of tissue composed principally of cells resembling adrenal cells. In the gross, this tissue was supposed to be an accessory ovary.

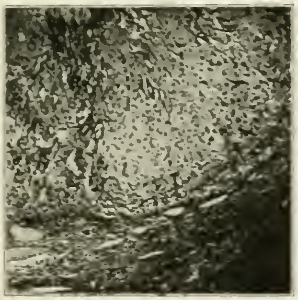

Fig. XIV. No. G 15-181. Compare with XIII. Section from normal ovary showing lutean cells, resembling somewhat though essentially different from the type of cell shown in Fig. XIII.

From the study of the case two points stood out prominently: 1st, there was a strong possibility of molar pregnancy, as she was too young for the menopause; 2nd, the pain was sufficiently intense to justify exploration. Accordingly, the uterus was curetted for diagnostic purposes, but the curettings were so scanty that none was available for examination. Exploration of the abdomen revealed a conglomerate mass of adhesions involving uterus, adnexa and surrounding structures to such an extent that no conservatism could be practiced and a supravaginal hysterectomy was done, ablating also both adnexa. It seemed marvelous how far astray we had been led by the story of this woman's illness. It appeared inconceivable that we could have thought of such a rare condition as molar pregnancy, when apparently the gross specimen revealed plainly the fact that the condition was nothing but an ordinary, every-day pelvic infection. The appearance of the gross tissue was doubly surprising in that it did not explain the prolonged amenorrhea, as the uterus was not of the firm, contracted, fibrous type, nor was there total absence of functionating ovarian tissue. The routine microscopical examination, however, explained quite clearly the previous unaccountable amenorrhea and gave us as well the only proper, ultimate conception of our problem, as both tubes were the seat of a typical tuberculosis (Fig. VIII).

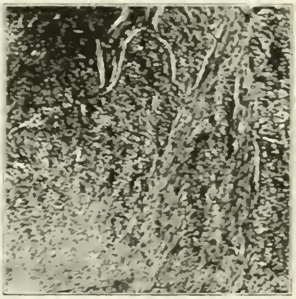

Fig. XV. No. G 15-37. Section from tumor of the round ligament, showing bundles of smooth muscle fibres surrounded by dense connective tissue.

Equally interesting was the following case. An emaciated, cachectic-looking young girl with a large pelvic tumor was admitted to the service with a diagnosis of ovarian sarcoma. The abdomen was alarmingly distended and tense, but in spite of this, it was thought that a large, irregular mass could be palpated on the right side. The rest of the abdomen apparently was filled with fluid. This suspicion was increased with the knowledge that a large quantity of fluid had been removed by tapping, before the patient's admission to the hospital. At operation the source of the fluid was determined to be a large cyst, lying next to which and forming part of its wall, was a more solid mass, which was probably the palpable portion before operation. Considerable discussion immediately arose as to the real nature of this ovarian tumor. Many suggestions entirely at variance with each other were freely made, changed, modified and made over again. Sarcoma was still considered by some and ignored by others; sarcoma with simple cystadenoma was suggested: carcinoma alone and with cystadenoma was thought to be a possibility; and finally, even dermoid and cystadenoma alone were temporarily suggested. It remained for the routine microscopical examination to settle definitely the controversy, to make the record accurate, and the post-operative diagnosis correct. Section from the more solid portion of the tumor (Fig. IX) showed an adenocarcinoma, and that from the adjoining large cyst wall showed the same histological characteristics, as can be seen in Fig. X.

Many further examples might be adduced to show the practical value of routine microscopical examinations, but the cases already cited will probably furnish sufficient evidence. In the same manner, the value of this routine form of examination from a purely scientific standpoint, can be demonstrated equally well by the citation of but a case or two more.

Who can appreciate thoroughly, for example, the efficacy of the radical panhysterectomy of Wertheim, without having studied such a specimen as that shown in Fig. XI? This circumscribed carcinomatous nodule was a trifle larger than the size of a large pin head. The nodule was removed from the parametrium, at a distance of from one and a quarter to one and one-half inches from the outermost limits of the lateral margin of the cervix. Suppose, as can be readily conceived, that such a nodule was the only carcinomatous focus outside of the tissue removed by the ordinary panhysterectomy, it would be distressing to realize that such a definite, circumscribed, well-defined, removable area had been so injudiciously overlooked. Considering the subject from this point of view, the attitude that after all the radical hysterectomy with its high mortality offers little more than does the ordinary panhysterectomy, is not even worthy of serious consideration or discussion. Yet thorough appreciation of the Wertheim technic is difficult to obtain, unless such a nodule is occasionally encountered in the course of routine microscopical examination.

Again, from the purely scientific standpoint, where it is simply a question of making a piece of tissue mean more to us than merely a "lump," the routine microscopical examination is indispensable. Fig. XII, for example, demonstrates an entirely unsuspected, interesting condition, in the form of a simple adenoma of the ovary. In Fig. XIII is seen a similar example, in the form of what appears to be, microscopically, an accessory adrenal. This section was made from a case which was thought to have an unusual congenital abnormality in the form of an accessory ovary. The gross tissue resembled an ovary in size, shape, color, consistency and location. Without the microscopical examination, this case would certainly have been recorded as a rare example, on account of the presence in the same individual, of three separate and distinct sex glands of the same type. This case was brought to mind recently by another case in which the presence of a similar condition had to be seriously considered. In conjunction with other pelvic pathology, there was found a hard, elongated mass about the size of a marble, forming part of the round ligament and densely adherent to the right internal inguinal ring. As this was an isolated mass, situated in one of the areas in which accessory adrenals are prone to be found, this possibility naturally came to mind. Speculation as to the real nature of the round ligament growth was unnecessary, however, as the microscope settled definitely the fact that we were dealing with a fibromyoma. (Fig. XV.)

A point which might arise in a general discussion along the lines followed here, is that as a result of routine microscopical examination, the surgeon might be seriously inconvenienced or embarrassed by being confronted at times by reports of microscopically normal appendices, tubes, ovaries, etc. As a matter of fact, the very objection is a strong argument in favor of the method. Certainly the appendix, and to a very much less extent even the tubes, are sometimes deliberately removed for various reasons, even though they are not in themselves diseased. A report of normal tissues in such cases is therefore to be expected. If, however, removal of microscopically healthy organs was required, for example, on account of accidental impairment of the circulation, of superficial adhesions, or of congenital or acquired distortion which might later produce trouble, certainly a negative report in such cases could do no harm. If as occasionally might happen, a deliberate error was discovered, the report here especially would be of inestimable value, because it would probably prevent the repetition of a mistake which otherwise might be remade indefinitely.

Furthermore, as a check, in the practice of conservatism, unquestionably many valuable lessons can be learned from the routine microscopical examination of all tissues removed, especially if at the time of operation they were deemed too much diseased to be left behind. For example, routine microscopical study of all extirpated ovaries, undoubtedly would result in the subsequent saving of untold numbers of these frequently unoffending victims.

It must be granted, of course, that routine microscopical examination of all extirpated tissues cannot be depended upon exclusively in the study of a gynecological problem. The only contention made is that it is a necessary adjunct for the proper practice of gynecological surgery, and that it will often reveal to the unsuspecting eye of the operator many valuable truths in connection with his patient.

Note.—The author is indebted to Dr. John A. Lanford for valuable assistance in making the photomicrographic autochromes utilized for illustration of this paper.

GANGLIONEUROMA.

Ganglioneuroma are not confined to any particular age-period, but have been observed at all ages from early infancy to old age. They tend, however, to be more common in younger subjects, and also tend to be of larger size according as the age of the patient is less. The largest described have been about the size of a child's head. Sex does not appear to be an important factor in determining their incidence.

As a rule, the tumors are encapsuled and quite simple in character, and there are records of successful surgical removal in seven cases, but frequently the deep situation and closeness of the growths to vital organs is such as to render difficult or impossible the removal even of those which are histologically simple.—J. S. Dunn, in *The Glasgow Medical Journal.*

THE QUESTION OF THE PRELIMINARY CATHETERIZATION OF THE URETERS AT THE TIME OF THE WERTHEIM OPERATION.

This has been of value in the development of pelvic operations in the hands of several operators, and it has been particularly used in hysterectomy for servical cancer because the ureters have been injured in this operation more frequently than in all other pelvic operations combined. I believe it is an unnecessary procedure in this operation if one will expose the ureters at the onset and if the operator is familiar with the anatomy of the pelvis.—John A. Sampson in the *N. Y. State Journal of Medicine.*

ACUTE APPENDICITIS.

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Louisville, Ky.

While in typical cases of acute appendicitis the symptomatology is usually sufficiently characteristic to insure diagnostic accuracy, several intra-abdominal and intrapelvic lesions have to be differentiated or at least must be considered before the clinician can be certain of his diagnosis; and in some cases considerable difficulty may be experienced.

In the majority of instances the most dependable diagnostic indications are: the leucocytosis, the pain, the rigidity, and the localized tenderness, especially where pain is felt when pressure is made upon the opposite side and suddenly released, i.e., when pressure is made on the left side in acute appendicitis the pain will be felt over the appendix and not at the point of pressure.

(1) In rupture of the sac of a right-sided ectopic gestation, the sudden occurrence of intense pain may mislead the attendant unless he is familiar with the previous history of the patient. Anamnesis will usually disclose evidences of pregnancy. In acute appendicitis sudden collapse is rarely observed, excepting in fulminating cases with rupture; the signs of serious internal hemorrhage are lacking; the circulation and temperature are less profoundly impressed. Vomiting and abdominal rigidity may be present in both lesions, but are more pronounced in appendicitis. Marked anemia is often noted in ruptured ectopic gestation. In many recorded instances diagnostic errors have been made.

(2) In mechanical obstruction to the fecal outflow from any cause, the early symptoms may simulate those of acute appendicitis. However, in obstructive lesions the temperature is commonly subnormal in the beginning, followed later by a gradual rise. The pulse is rarely accelerated, usually slow at first. Physical examination may reveal the site of obstruction some distance from the appendiceal region; borborygmus and other evidences of exaggerated peristalsis are present; vomiting is incessant and propectile, soon becoming feculent. In appendicitis the intestine is quiescent and vomiting is non-projectile, being paralytic rather than mechanical in origin. Intussusception is rare in adults, and acute appendicitis is equally uncommon during infancy. The early appearance of blood in the dejecta, and the presence of a mobile tumor, will make the diagnosis of intussusception certain.

(3) In pneumonia involving the lower right lobe, the early manifestations may be sufficiently confus-

ing to render diagnosis uncertain. While in some instances no pulmonary signs may be at first evident, the increased rapidity of pulse and resporation, and the higher temperature range, are indicative; the pain is greatest above the costal margin; abdominal rigidity is uncommon; the characteristic pulmonary symptoms later appear. The leucocyte count is lower in pneumonia than in acute appendicitis; the blood pressure may be higher in pneumonia.

(4) In cholelithiasis — including cholecystitis, cholangitis, and choledochitis — there is usually a history of previous attacks of right abdominal and epigastric pain, the so-called "hepatic colic," "gall stone colic," etc. Oftentimes the patient will state that he has been treated at various times for "indigestion," "gastralgia," and other misnamed digestive disturbances. Vomiting is a common symptom; pain is higher than in acute appendicitis, and is transmitted to the chest, the back, and the right shoulder. Rigidity may extend to the appendiceal region; the greatest tenderness is just below the costal margin; the presence of choleliths may rarely be determined by palpation; jaundice may or may not be present. Nothing characteristic about the pulse, temperature, blood pressure, or leucocytosis. Röentgenoscopy is claimed by some observers to determine the presence of gall stones, but many stones give no shadow.

(5) In right-sided renal and ureteral lesions, especially if nephroliths or ureteroliths be present, the diagnosis can be perfected by Röentgenoscopy where uncertainty exists. In so-called "renal colic" pain is intense, usually referred to the testicle, the pelvis, or the inner aspect of the thigh, and its location is higher than in acute appendicitis; there is no abdominal rigidity; vomiting is exceptonal. The microscope shows blood in the urine; cystitis is rarely present. Blood pressure is high; leucocytosis unchanged.

(6) In right-sided salpingitis and ovaritis — including small pyosalpinx and ovarian cyst—differential diagnosis may be difficult. Practically every clinical symptom of acute appendicitis may be present, and it requires careful bimanual examination to clarify the existing uncertainty. It is well to remember, however, that the onset of tubal and ovarian lesions is seldom sudden, study of the clinical history will usually reveal evidence of previous attacks of pelvic pain, and as a rule the etiology of lesions involving the tubes and ovaries differs essentially from that of acute appendicitis. The leucocyte count should be higher in acute appendicitis.

(7) In the crisis of tabes, the abdominal symptoms may occasionally suggest acute appendicitis, and diagnostic errors have occurred. According to Nazum (*Journal of the American Medical Association*, February 12th, 1916), of one thousand tabetics, 8.7 per cent were subjected to celiotomy under mistaken diagnoses, chiefly through failure to examine the nervous system. Gastric ulcer, gall bladder disease, and appendicitis, were the diagnoses most frequently made (Nazum).

(8) In typhoid fever, involvment of the appendiceal lymphoid tissue may produce pain and other symptoms of acute appendicitis. When perforation of a typhoid ulcer of the ileum in the right abdominal area ensues during the early stages of the disease, the pain, rigidity and tenderness without increase in the leucocyte count, are characteristic—the presence of rose spots and a positive widal reaction will be sufficient.

One of the most difficult cases I ever encountered where differentiation had to be made between acute appendicitis and typhoid fever with perforation, recently came under observation in the Louisville Public Hospital. I was asked to see a man who had been admitted without any history, but was presumed to be suffering from acute appendicitis. He had not been under the care of a physician, had been feeling ill only a short time, had not been confined to bed, in fact had walked to the hospital. He complained of nothing excepting intense pain in the right abdominal area. The leucocyte count was between 8000 and 9000. The abdomen was tender, there was some elevation of temperature, but the pulse was normal; there was no abdominal distension. The tongue was slightly "furred" but not typically typhoid in appearance; there was slight mental hebetude. Inspection of the abdomen revealed a few small red spots which excited my suspicion, and after a careful examination I concluded the patient was suffering from a perforated typhoid ulcer and not acute appendicitis. The temperature had been below normal, and had gradually risen. This, to my mind, was in favor of typhoid fever, when considered in connection with the leucocyte count, although temperature variations sometimes occur in perforative appendicitis of the fulminating type. The diagnosis of perforation of a tpyhoid ulcer was confirmed by operation.

In April, 1901, I was called to see a woman who had aborted two or three weeks before, and was suffering from pain in the right abdomen and pelvis. Her physician suspected appendicitis. I examined her very carefully; there were no distinctive symptoms, not even slight abdominal rigidity. Pressure over the appendix elicited tenderness, but this was insufficiently marked to indicate acute appendicitis. A low form of fever was present, and believing it to be typhoid, I decided not to operate. A few days later I went abroad. Returning in October I was again asked to see the patient, and found present a typical appendiceal abscess. The woman was moribund at the time, and died within six hours. Necropsy revealed three abscesses, one in the pelvis, a second in the right loin, and a third in the right iliac region, all probably being due to appendicitis from which she suffered when I first saw her. This was evidently a case of appendicitis with a slow-forming abscess, and I made a mistake in my conclusions.

A vivid recollection of the foregoing history enabled me to make the diagnosis in another case of appendicitis. I was called to see a man whose temperature range was from 98.6° to 99° F. He had right abdominal pain upon pressure. Operation revealed a ruptured appendix, with a fecalith protruding from it. There were practically no symptoms excepting severe pain. Fever as a diagnostic sign of acute appendicitis is unimportant. I have encountered cases where the temperature was normal. A physician seen in consultation with Dr. William C. Dugan had been under conservative treatment in a local hospital for some time, the diagnosis of appendicitis having been made. His temperature had been normal for a week. He had arranged, against his attendant's advice, to go home the next morning. During that night the abscess ruptured, and as a result the patient had extensive peritonitis.

(9) In tubercular peritonitis and intestinal tuberculosis, diagnostic errors are rather frequently made, particularly where pain is most intense in the right iliac region. Evidences of tuberculosis elsewhere within the economy may not be disclosed by the most careful and painstaking anamnestic and clinical investigation. The initial symptom may be persistent pain in the right lower abdomen. The leucocyte count is diagnostic of acute appendicitis.

Occasionally there is considerable difficulty in differentiating acute tubercular peritonitis from acute appendicitis of the fulminating type. I have seen three such cases where the symptoms appeared suddenly. One of the patients was operated upon for acute appendicitis. Abdominal incision revealed a ruptured caseous gland, and the cavity contained a small quantity of serous fluid. No other treatment was instituted. The abdomen was merely opened, the appendix removed, and the incision closed. The patient promptly recovered, as is so often true in cases of tubercular peritonitis.

Another case was reported before the Jefferson County Medical Association some time ago. The patient was a girl of seventeen, who began feeling ill in September, 1915. Menstruation had occurred at the regular time (September 14th), but continued one day and ceased. She had slight fever and felt ill the next morning, but her distress was insufficient to attract much attention. Her general appearance was good, she was well nourished, but her mother said she had recently lost considerably in flesh. Her grandmother had died of tuberculosis in the home a year previously. She worked during November and December in an office with a gentleman who had a severe cough, and it was later ascertained that he had a desperate case of phthisis. On Friday night this girl came home complaining of pain in her abdomen. On Saturday there was noted considerable distension. She was then seen by the family physician, who found upon palpation that the abdomen contained fluid; there was great distension which resembled a large ovarian cyst. An impulse was noted upon palpating the abdomen, the presence of fluid being readily recognized. There was much tympany, but no distinct area of increased dulness upon change in position. The fluid evidently filled every crevice, but did not reach the surface in any locality. Her temperature had been 103° F., there was severe abdominal pain, and the family physician made the diagnosis of tubercular peritonitis, which I confirmed after a careful physical examination. Rectal investigation revealed an area of induration near the right side of the uterus, which was also thought probably tubercular. Celiotomy was advised and accepted.

At the operation we removed both Fallopian tubes, which were in a state of chronic inflammation, filled with cheesy material, and studded with tubercles. The intestinal surfaces were covered with nodules and "bound together" by adhesions, and the abundant fluid present accounted for the large amount of tympany. The omentum was thick and leathery, and also studded with tubercular nodules. A von Pirquet test was made during the time the patient was in the hospital: it was not distinctly positive, although there was slight reaction in the central portion of the inoculated area. This test is important in attempted differentiation between tubercular peritonitis and appendicitis, but in extreme cases like this, operation should not be postponed awaiting positive differential diagnosis. The leucocytosis will be the better guide. The leucocyte count in this case was 6800.

(10) In cecal and appendiceal carcinoma, the symptoms closely resemble those of acute appendicitis, especially where perforation has occurred, and differential diagnosis may be impossible.

Physical examination reveals no indicative clinical signs, and the same is true with reference to anamnesis, blood pressure, and leucocytosis. Röentgenoscopy is of material value in diagnosis. The finding of occult blood in the stools is important.

In the following instance a mistake was made, i.e., I diagnosed appendicitis, and operation showed a cancer of the large intestine. Examination of the literature on intestinal carcinoma shows that I am not alone in this error. In about ten per cent of cases cecal carcinoma is diagnosed as appendicitis. The reason for this is that carcinoma frequently causes ulceration, there is perforation of the intestinal wall, and abscess formation. In my earlier experience I saw a number of cases of appendicitis with abscesses in the loin. I recall one in particular where a large abscess could be easily outlined; it was opened and drained, and the patient recovered. As the patient gave the history of several recurrent attacks of pain in the appendiceal region, I naturally concluded this was another similar case, but celiotomy revealed a cecal carcinoma with perforation and a retrocecal abscess. There were present all the clinical evidences of appendicitis, therefore the mistake was most natural.

In the majority of the lesions to which attention has been called in the foregoing, the uncertainty in diagnosis is unessential in so far as the treatment may be concerned. Of course, every surgeon would like to be absolutely positive about his preoperative diagnoses, but in lesions involving the right abdominal area experience has shown that differential diagnosis is occasionally difficult, and to postpone operative intervention because of diagnostic uncertainty is usually inadvisable; delay may mean death of the patient. I believe it is the height of surgical wisdom, where sufficient evidence of pathology has been found in the right abdominal area to justify celiotomy, to operate first and perfect the diagnosis afterward.

At the Birmingham, Alabama, meeting of the Southern Surgical and Gynecological Association (1904), I made the statement that in acute perforative peritonitis from appendicitis, I irrigated the abdominal cavity. I now want to change that statement—I no longer use irrigations. I could then see no reason why the surgical profession of this country could not "get together" upon a plan of treating appendicitis, which could be made generally applicable. Finney, of Baltimore, formerly advised cleansing of the intestine and peritoneum with gauze. Blake, of New York, advocated irrigation to remove as much of the infective material as possible, hoping for nature to take care of the remainder. Murphy, of Chicago, merely made an incision and manipulated the tissues as little as possible, depending upon nature to take care of the exudation. He employed proctoclysis. Fowler recommended elevation of the head and trunk.

Practically every surgeon of prominence in this country now believes in early operation for appendicitis, i.e., as soon as the diagnosis can be made. The late Dr. A. M. Cartledge, of Louisville, taught that one should wait until the third or the fifth day, giving the abscess time to form. Such ideas no longer prevail, as it has been shown that operation when the patient is first seen, regardless of when this may be, will give the best results.

When one is forced to treat appendicitis medically, the method of Ochsner is indicated. Starvation keeps the stomach empty and prevents peristalsis, thus giving nature an opportunity to improve the patient's physical condition. Ochsner, however, advocates starvation in every case of appendicitis prior to the institution of surgical treatment. I believe this is contrary to the best surgical teaching. It is now advised by the majority of surgeons that, as soon as the diagnosis of appendicitis can be made, operation is indicated. A few claim it is safer to postpone operative intervention until the physical status of the patient can be improved, under the belief that this plan insures a more prompt convalescence, that if operation be performed within the first few days recovery is slow and the result doubtful. It is my opinion, based upon experience, that if the patient be seen early and promptly subjected to operation, the mortality will be materially lessened; that if operation be performed within the first forty-eight hours the mortality will be no greater than during the interval between attacks.

It is my belief that purgatives have killed many patients with appendicitis. Twenty years ago I was a strong advocate of purging these patients, and my views were largely based upon the following observation: I operated upon a young girl for acute appendicitis. The infection was so virulent that she had gangrene of the colon. Drainage was practiced, and the extruded material was so foul that it caused sloughing of the wound tissues. I believed this was due to the extreme virulence of the discharge. It was then my opinion that by "flushing the bowel" before the operation, thus removing as much of the poisonous material as possible, the attack would be less virulent. I still think if this could be done before infection had developed, appendicitis might be prevented in many instances. After appendicitis has developed, however, purgation disseminates the infectious material and causes general peritonitis.

If forced to treat appendicitis by non-surgical means, I would put the patient in a sitting posture, administer nothing internally, use proctoclysis, and practice gastric lavage, if there was any vomiting. I would not give any violent purgative drugs, nor would any solid food be permitted. I do not agree with Ochsner, however, that patients seriously ill with appendicitis should be treated by this method, delaying surgery in the hope that sufficient improvement will occur to make operation safer. A fifteen-minute operation may be performed if necessary, and drainage instituted; then the Ochsner treatment may be applied. In that way better results can be secured than by depending upon nature to dispose of the infective material.

I cannot agree in the statement that high leucocytosis is an indication of extreme danger in acute appendicitis; a high leucocyte count simply means that the patient has good resistance. Where the leucocyte count is low, nature has not established the necessary resistance, and the condition is more unfavorable. In many instances the onset is so acute with sudden chills, fever, etc., that resistance cannot be established. When the leucocyte count is 20,000 to 28,000, the patient usually recovers. That, at least, has been my experience.

The best way to treat appendicitis is to operate when the patient is first seen. In former years, patients sometimes persuaded me into permitting them to try and "fight off" the attack. These patients frequently had recurrences, and in those days my mortality was at least fourteen per cent; that, in fact, was the mortality in my first one hundred cases of appendicitis operated upon. In June, 1915, I reported two hundred consecutive cases of acute appendicitis, many of them with peritonitis, operated upon so soon as the patients came under observation, with only one death. I have since had no deaths from acute appendicitis in forty additional cases; that makes a total of two hundred and forty consecutive cases of acute appendicitis operated upon with only one death.

I do not use iodine within the abdominal cavity. Where the appendix is acutely inflamed, and rupture has not occurred—even although the appendix may be distended with fluid, if it has not ruptured this cannot be said to be pus—the appendix is merely removed and the opening in the cecum closed. This entails less likelihood of future fecal fistula and more prompt convalescence than any other plan. The operation ought to be completed within fifteen minutes, and where the abdomen is closed without drainage the patient is practically well within a week. When the attack has progressed to abscess formation, or where the appendix has ruptured and there is a large quantity of pus in the cavity, in my opinion drainage should be practiced. In some instances, however, I have cleansed the cavity as thoroughly as possible by sponging and closed the abdomen without drainage. In certain cases drainage should undoubtedly be employed, and for this purpose I use ordinary rubber tubes with gauze wick, and apply a dry dressing over everything excepting the drainage tract where a hot saline compress is applied. The drain is removed in five to seven days. By pursuing this plan, doing as little manipulation within the abdominal cavity as possible and completing the operation quickly, the patient is given the best chance of recovery.

Some will say, in cases where abscess has formed, shall the incision be made over or internal to the abscess? It has been my practice to open the cavity internal to the abscess, and, after thoroughly packing with gauze about the sac, to rupture and evacuate the pus, then after excising the appendix and closing the cecal opening, to remove the gauze and insert a drain.

As to removal of the appendix: If prolonged operation be necessary, with consequent increased shock to the patient, it is advised that the appendix be not removed; but wherever it can be done without additional risk to the patient, the appendix should invariably be removed at the original operation. In this way further leakage is prevented, and it must be remembered that leakage from an infected appendix carries poison into the abdomen.

Irrigation of the cavity was discontinued, because it was found utterly impossible to cleanse it thoroughly. After irrigating until it was supposed everything was perfectly clean, additional exudative material was discovered by inspection. Diluting the toxins renders absorption more rapid, and the patient becomes quickly poisoned. It is better to push the intestines aside in general peritonitis, then insert a large sponge into the pelvis for a few minutes to absorb as much of the exudative material as possible, and then complete the operation as quickly as practicable. I no longer irrigate; nor do I "pour iodine solution into cavity" according to the method of Crisler. The latter is believed not only to be a dangerous but an unnecessary procedure. It has been demonstrated by recent experimental tests upon rabbits and other animals, made by three competent observers, that a two per cent solution of iodine caused peritoneal adhesions. Crisler's statistics show about five times as many secondary operations for the separation of adhesions following the "pouring of iodine into the cavity" than where iodine was not so used.

As to the question of drainage through the loin:

For many years I have not employed this method of drainage. My plan is to use one, two or three rubber tubes, as may be necessary—but rarely more than two. The tube is of the ordinary soft rubber type, split from the proximal end to where it protrudes from the incision; sometimes sheet rubber and gauze are used, making the so-called cigarette drain. All that is required is a vent so that in case of re-formation of the abscess a tract is provided through which the fluid may find exit. It must be remembered that gauze, rubber tubes, or any other kind of drainage, removes very little pus. Persistant use of the hot pack is advisable. When the hot pack is removed a small amount of serum or pus may be noted.

The post-operative management of acute appendicitis is also important. Many patients are killed after the operation by improper treatment. Crile believes the kidney is primarily responsible for death in many of these cases from acidosis following the anesthetic. He says if the patient be thoroughly narcotized after operation death does not ensue. It is my practice to give morphine, if there is sufficient pain or discomfort to require it; if the minimum amount of damage has been inflicted by manipulation within the cavity, one dose of 1/6th grain morphine will suffice. I disagree with Crile that the patient should be narcotized, as this in itself might cause acidosis. If the patient's abdomen becomes distended, or there is vomiting before or after the operation, gastric lavage should be practiced several times if necessary; enemata may also be advantageously employed. Nothing will relieve abdominal distension like gastric lavage and properly given enemata.

I do not care whether my patient after appendicectomy has an alvine evacuation within four days or not. In my opinion much harm has been done by the giving of purgatives shortly after operation—as was the almost universal custom until quite recently—fearing that the patient would die unless the intestinal contents were promptly evacuated. The patient is placed in a sitting posture within an hour after the effects of the anesthetic have been dissipated; proctoclysis is used in every case where the condition of the patient demands it; the stomach is irrigated when necessary. The patient does not get any food until nausea has ceased; water is allowed *ad libitum.*

One of the most serious cases of acute appendicitis that has ever come under my observation occurred in a girl aged three and a half years, who had been ill several days before I was called. She became progressively worse, and there were symptoms of rupture of the appendix about ten o'clock at night; she was taken to the hospital and operated upon the following day about noon. Although *in extremis* at the time, she made an uneventful recovery.

If the patient has enough resistance to assist in overcoming the infection, if the operation be performed with as little trauma as possible, and if an anesthetic be used which will not cause the liver cells to be embarrassed, recovery should be the rule. In several of my earlier operations when chloroform was used as the anesthetic, the patients later had intense jaundice with evidences of profound toxemia, and until attention was called to the fact that the liver cells were disintegrated and destroyed by chloroform, we were at a loss to account for the development of these symptoms. During the "chloroform days" when my mortality was high, some of the deaths may have been correctly attributed to the after-effects of this drug. At present I am using nitrous oxide gas with just enough ether to relax the patient, in some cases gas entirely; in young children chloroform is sometimes employed; but in the appendicitis of adults gas and ether are preferred.

As to treatment of the colonic wound after excising the appendix: The appendix is first clamped with two Halstead forceps, gauze is packed around it to prevent the cavity from being soiled, the gauze being pushed well downward to make room for the scissors, and the appendix is then severed flush between the two clamps. A Lembert suture is so arranged that when the forceps are removed and the suture tightened the cecum is perfectly smooth, no stump of appendix being left to slough. This method is not original with me, Deaver, of Philadelphia, having employed it for several years. I began its use, however, without knowing it had been devised by someone else. The operator must be certain in every instance that hemorrhage has been arrested. After making the necessary traction upon the suture, the two ends are tied; when the knot has been made tight the cecal opening can barely be seen; with a straight needle and linen thread a pursestring suture is then introduced which entirely closes the opening. Since adopting this method of dealing with the appendix, not a single fecal fistula has occurred in my practice. Formerly when a ligature was passed around the appendix, the stump being invaginated and gauze packing inserted, fecal fistulæ followed in several instances from sloughing of the stump, cutting away of the ligature, or other causes.

The contact of gauze with the intestine is likely to produce fecal fistula. When the gauze is removed the intestinal peritoneum is damaged, and a fistula is the logical result. The gauze should not be allowed to extend to the intestine. If an ordinary rubber tube is used the distal end should be left intact to prevent exposure of the gauze; thin rubber sheeting may be used in similar manner, the gauze barely reaching the edge. In this way the intestinal peritoneum cannot become engaged in the gauze mesh, and when the drain is removed the tissues are not damaged.

APPENDICITIS—A RECORD OF PERSONAL EXPERIENCE IN 1915.*

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A few years ago Codman described a system for recording the final results in operated cases, which he had instituted in his hospital in Boston. This, the so-called "end-result system," aroused the interest of the surgical profession, with the result that many hospitals have adopted it, in some modification, and surgical organizations have appointed committees to devise methods for its general application, and to encourage its use.

The surgeon is at a distinct and considerable disadvantage in comparison with the internist. He frequently turns his patient over to the family practitioner soon after an operation, or he operates out of town or upon a patient from a distance, who leaves for home immediately after release from the hospital. Generally speaking, the surgeon loses touch with his case soon after recovery from the operation.

The end-result system impresses upon the surgeon who employs it the fact that the immediate technical success of an operation is only one of the important desiderata. The patient comes to the surgeon to be relieved of a certain set of symptoms, and the ultimate success of the surgical treatment should be measured in the terms of such relief. An appendicectomy, for instance, which leaves the patient with a weak or bulging scar, with neuralgic pains, or griping constipation which may persist indefinitely or require secondary operation, is not a complete and unqualified success from the point of view of patient or of the recommending physician.

The advantages which the individual surgeon may derive from the study of personal cases are just as great as those acquired from the massed statistics of a large hospital. It is only by this sort of observation and study that the surgeon can perfect his technic and obviate minor and distressing complications. Ordinarily a surgeon gradually acquires the tenuous excellence which we call judgment, as the result of the mentally recorded observation of years. Some form of the "end-result system" will undoubtedly crystalize his results so that he can have the benefit of his experience in a tangible form after a much shorter interval.

There are undoubtedly hosts of surgeons who are applying this system in one form or another in their records. Beginning with 1915 I started a scheme of recording my personal operations in such fashion as to make them readily accessible for following up, and about April 1, 1916, I rounded up the results for the preceding calendar year. This tabulation, although from one point of view simply a statistical study, has nevertheless afforded me considerable interesting information.

Naturally such personal statistics are not so complete as those worked up on a strictly hospital clientele. My plan was to get into personal touch with every patient upon whom I had operated during the year, so as to learn his or her present condition, but I gave this up for several reasons. First, it would require more effort than it would justify, and, second, I felt that where the patient had been referred by a general practitioner he might not take kindly to the idea. In this tabulation, therefore, I recorded simply what I knew by direct observation about each patient, and what I found out by inquiry; I think it may be taken for granted that all the complications and sequelae have come to my knowledge.

During the year 1915 I performed 303 operations requiring an anesthetic. As I do general surgery, I listed these cases roughly by divisions, so as to facilitate comparative study as follows:

Abdominal.
Bones and joints, including osteomyelitis and fracture.
Orthopedic operations.
Neurological-brain, cord and peripheral nerves.
Thorax, empyema.
Breast.
Pelvic.
Genito-urinary.
Rectal.
Infections of the soft parts.
Miscellaneous.

Naturally the form of listing will depend largely upon any given man's practice or predilections, but with the list of operations for the year at hand, a convenient classification can easily be worked out.

Under each division I made clinical subdivisions to include all the conditions for which I had operated. Then under each heading a separate entry was made for every case—age, sex, diagnosis, operation performed, result, stay in hospital, end-result, remarks. Many of the operations were of a less usual type and were done only once or a few times during the year. Others represented operations of small moment, such as incisions for infections, removal of superficial tumors, etc.

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It would be uninteresting and laborious to present here the notes which I made on each of these subdivisions, but as an example of the way I went at it I shall briefly summarize my appendicectomies, this being the operation which I performed the greatest number of times during the year, with some remarks on technic. I present these statistics without flourish, not as representing a large series, or a low mortality, or distinctive methods, but simply to record a personal experience.

Of appendicitis I operated upon 71 cases during the year 1915. Of these 41 were male patients and 30 female. The youngest was 12 years, and the oldest 50, the average age beeing 26. For convenience in classifying I have divided these into five divisions: the interval or quiescent cases, the acute undrained, the acute drained, the appendix abscess, and the general peritonitis.

Of the *interval* or *quiescent* cases there were 8, of which 6 were in women. In all but 2 of these the muscle-splitting or gridiron incision was used. There were no casualties or untoward complications. The average stay in the hospital of the patients in this group was 13 days.

The end-result in these cases has been good.

Acute undrained appendix. Eighteen cases, of which 12 were in women. The gridiron incision was used in 11 cases and the right rectus in 6. All the male cases were by gridiron incision, except one. One male of 20, who entered the hospital in a serious condition, died 48 hours after operation of septicemia. One male of 18 developed pneumonia on the fourth day and was discharged well on the 31st. Of the remainder, the average stay in the hospital for gridiron cases was 11 days, and for the right rectus 15. The pathological report on some of these cases was "chronic" or "healed" appendicitis, but all had acute signs at the time of operation, and were surgically acute.

One patient, a woman who had been under treatment for neurasthenia before the attack of appendicitis, had a recurrence of pain about a month after operation. The pain was severe and persistent. She desired re-operation, but nothing surgical could be made out, and I placed her in the hands of a neurologist, who has had some success in relieving her complaints. Otherwise the final results have been good.

Acute drained cases. These were drained either because of the presence of free serous fluid, or on account of the condition of the appendix. There were 19 cases, 5 in women. All were gridiron incisions, except 4. A gangrenous appendix was found in 11 cases; and free fluid in 8. One woman of 26 years had a continued fever following operation and was found to have phthisis. Her sinus drained for a month and she was discharged to a sanitarium on the 41st day. It is likely that the appendix was tuberculous, but we had no pathological report. One male of 30 had a sloughed retrocecal appendix, which was removed with great difficulty. He showed signs of internal hemorrhage, and on the 9th day I re-opened him under gas-oxygen and tied off a small oozing point behind the cecum, following this by a transfusion. He was discharged, well, on the 41st day. Except for these two cases the average stay in the hospital was 19 days.

One patient, a woman, returned four months after discharge with pain simulating appendicitis. X-rays revealed a stone in the ureter, which was removed by operation. Another patient discharged two buried chronic gut sutures through a stitch abscess. Otherwise there was no complication.

Appendix abscess or *localized peritonitis*: Thirteen cases, of which 4 were in women. Seven were opened by the gridiron incision, 6 by the right rectus, including all the women. The right rectus incision was used in women, because it is often difficult to differentiate between an appendix abscess and a pus tube. The right rectus incision was used in the male when the abscess mass occupied a position near the median line. Free fecoliths were found in two cases. The appendix had sloughed off at the base in one case, and in another it was pulled off in handling. In all the appendix was found and removed. One girl of 16 had a toxic erythema on the 13th day, simulating scarlet fever. Average stay was 21 days. No complications.

General peritonitis: Under this heading I include 13 cases in which there was pus or purulent fluid free in the abdominal cavity. Of these 3 were in women. Seven had the gridiron incision and 6 the right rectus. In about half of these cases two drains were placed, one, a cigarette drain, to the pelvis and the other, of iodoform gauze, to the base of the appendix. In 6 the appendix was gangrenous. In one the general condition did not justify exploration and the appendix was not found; a button-hole was made in the flank for drainage. All were kept in the high Fowler's position, and starved for 48 hours, during which period the continuous rectal drip (10% glucose in water) was maintained. One male, 27, with advanced phthisis, died 6 hours after operation. His peritonitis was of 3 days duration, and he showed a pre-operative white blood cell count of 71,000. One male of 44 died on the 6th day from septicemia. A girl of 17 and a boy of 18 developed toxic erythema, the girl being transferred to the contagious department of the City Hospital as scarlet fever on the advice of Dr. Place on the 5th day. Excluding this case and the 2 that died, the average stay in the hospital was 22 days.

The question of when to operate has been the subject of a certain amount of discussion. I belive that, generally speaking, the best time to operate is as soon as the diagnosis is made. Six times in the year 1915 I met mild cases of appendicitis in whom for one reason or another it was extremely desirable to avoid or postpone operative treatment. In these cases the expectant treatment advised by Oschner, with some modification, was employed. Two of these cases were operated upon later in the quiescent stage, 3 have had no further trouble, and the other has had two similar attacks since, but has not yet been operated upon. Otherwise I have never postponed operation when the presence of localized pain, tenderness with or without spasm, and fever or increased leucocyte count made it evident that some inflammatory process was going on in the right lower quadrant of the abdomen. This position has been justified by my experience in finding gangrenous or perforated appendices in the presence of very mild local or constitutional symptoms. I have consistently disobeyed the rule not to operate upon patients between the fourth and ninth days, and I see no reason for regret.

The anesthetic has been ether by the drop method, except that in children I have sometimes used the closed cone. I operated a few times under gas-oxygen, and once under novocaine, but I have had much more satisfaction with the ether, and I prefer it, even in desperate cases, when properly administered. If preceded by morphine with or without scopolamin, very little ether may be required in persons who may not stand it well. I use morphine, however, only in exceptional cases. Under ether anesthesia one can operate rapidly and, if the administration is smooth, with a minimum of shock.

The preparation of the patient consists in shaving the operative field and the administration of a low suds enema. In emergencies the enema has occasionally been omitted. The skin is prepared on the table, using benzine, iodine, Harrington's solution and alcohol, in sequence. If applied so that the solutions do not run on the skin, there will be no irritation or eczema. This preparation leaves a narrow frame of iodine marking the limits of the operative field, which preserves natural color.

Generally speaking, I practice the muscle-splitting or gridiron incision which I learned years ago, and which has been described in detail (Crandon and Scannell, *Boston Med. and Surg. Jour.*, 1905, CLIII, 711). This technic allows of a direct and rapid approach, without destruction of nerve or muscle fiber, and practically without hemorrhage. In clean cases it brings one down onto the cecum near the base of the appendix, and if an abscess is present it allows of a short and direct drainage tract, which does not soil the general peritoneal cavity. Oftentimes it opens external to the line of adhesion of omentum to anterior abdominal wall, and as a result the abscess can be treated practically as if it were without the peritoneal cavity. With this incision I do not wall off, because in clean cases it is unnecessary, and in infected cases it serves no useful purpose and disseminates the infection.

The wound is easily closed; a running catgut stitch for peritoneum, a catgut mattress suture for each muscle layer, transversalis, internal oblique, and aponeurosis of the external oblique, and a subcuticular silkworm gut stitch in the skin. The short horizontal scar is hardly noticeable. In drained cases I have sometimes sutured only peritoneum and skin and allowed the other layers to close by their normal contraction. I have never seen hernia following this operation, even in drained cases, and I believe it to be practically impossible, one reason being that the nerve supply to the muscles is not damaged.

For drainage I use a cigarette wick placed to the base of the appendix or into the abscess, if such exists. This wick is partially removed on the fourth day and taken out on the fifth. If, in the presence of a copious discharge, a sinus persists, it is dilated every second day with the little finger and balsam of Peru poured directly into the wound, the skin edges being approximated by adhesive straps. In cases of general peritonitis I ordinarily place two drains, a short one of iodoform gauze to the base of the appendix and a long cigarette wick into the pelvis; the iodoform drain is removed entirely after forty-eight hours and the cigarette wick is loosened on the fourth day and removed on the fifth. Thereafter a short rubber dam wick may be inserted for several days, to keep the skin edges apart.

Occasionally when the cecum is displaced upward and a softened or mushy appendix is adherent behind the cecum, or deep down in the pelvis, there is a certain amount of difficulty offered by this incision. In this case I do not hesitate to cut upward along the lines semilunaris, first extending the skin incision. This can be done after a little experience in such a way as to afford ample space, and leave a wound that can be repaired adequately and easily. It is only rarely necessary, however.

I do not employ the muscle-splitting incision in young children, in women in whom there is a question of tubal infection, or in those cases of appendix abscess where the tumor can be felt near the median line. I do not use it where exploration is intended. When the diagnosis of appendicitis can be made with confidence, McBurneys to my mind is the incision of choice.

As for after-treatment in clean cases the patient is allowed water immedately upon request. Food is omitted for 24 hours, morphia being given sparingly when needed. After 24 hours the patient is given broths, malted milk made with water, and orange albumin as desired, and a suds enema is administered. On the next day he is started on a diet of soft solids. If all goes well, he is allowed to sit up in a chair for a half hour on the fourth or fifth day, and thereafter for increasing periods. The stitches are removed on the eighth day, and adhesive strapping applied over the wound. Drained cases are allowed to sit up after the drain is out, as soon as the temperature is normal, provided the discharge is limited and the wound is well strapped. Right rectus incision cases are not allowed up in a chair until the stitches are out. Drained right rectus cases may require an adhesive supporting belt for several weeks.

The peritonitis cases have been treated by withholding food and water by mouth for 48 hours, maintaining the Fowler position, administering 10% glucose solution or water by rectum in sufficient quantities, and giving suds or milk and molasses enemata frequently as indicated. Recently I have acquired the habit of using pituitrin to forestall or relieve distention, and I have given six or more ampoules in 24 hours in severe cases, always, it seems to me, with benefit. I have not refrained, however, in cases of severe distention from using the time-honored methods of stupes, drastic enemata, and gastric lavage in the rare instances when they have been indicated. Moderate stimulation has been given when necessary and morphia has been avoided.

The mortality in this series has been moderate. I have lost 3 cases out of the 71, approximately 4%. Of these, 2 were cases of general peritonitis, of whom one was operated upon as a forlorn hope. The mortality in the general peritonitis cases was 16% and in the other 4 classes together was less than 2%. It is interesting to note that of the 26 quiescent cases three-fourths were in women, of the 18 acute undrained cases two-thirds were in women, and of the 45 drained cases, only one-fourth were in women. The mortality was all among males.

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CHOLELITHIASIS.*

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Biliary concretions are the result of disturbed metabolism. They consist of normal elements of the bile in allotropic or pathologic form. Usually they are composed of cholesterin and bilirubin-calcium. Calcium sulphate and calcium phosphate are less frequent constituents. Iron, copper, zinc, and mercury have been found exceptionally.

Some of the concretions are pure cholesterin. Most all "gall stones" contain cholesterin in at least eighty or ninety per cent. The cholesterin may be either amorphous or crystalline and laminated. Bilirubin-calcium very rarely is the chief constituent of a calculus. It is usually present in quantity less than ten per cent.

Calculi vary in size from the so-called "gravel" tone one which fills the gall-bladder. The homogeneous calculus is seldom seen. On section the calculus usually appears to be the result of electrosynthesis; it has a nucleus, and is laminated and crystalline in formation. Cholesterin, bile pigments, bile-resin (Loomis), lime salts, mucus, epithelium, biliary acids, margarin, nematodæ and microbes enter into its make-up.

Normal bile is composed of the pigments—biliverdin and bilirubin, fats, soaps, cholesterin, lecithin, sodium salts, sodium glycocholic and sodium taurocholic acids, mucin, nucleo-albumin, carbon dioxide; chlorides, carbonates, phosphates, and sulphates of the alkalies and of calcium and iron. Enzyme, colloid, lipoid, and electrolytic (and electrifiable) substances united with oxygen effect the changes of bile metabolism.

Bile is both the external secretion of the liver, and the excretion of certain systemic products of metabolism, as cholesterin. Bile is secreted under 15 m.m. pressure; hence, higher than the portal blood pressure. The liver is therefore a high-pressure organ. Bile is continuously secreted; the amount in twenty-four hours usually reaching one to one-and-a-half pints. It is excreted only at certain periods. Therefore, we have a bile secreting, and a bile excreting, mechanism. Both are affected in cholelithiasis. The excretion is effected by means of the rhythmic contractions—every fifteen or twenty seconds—of the gall bladder and the muscled bile ducts. Its secretion is greatly augmented by the ingestion of food. This acceleration continues up to the fourth hour, then the secretion diminishes.

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*Read before the Grayson County, Kentucky, Medical Society, April 27, 1916.

The ingestion of food causes a great increase in the quantity of blood passing through the abdominal viscera. That the increased biliary secretion was not due to the quantity of blood was proven by the use of gamboge. This irritated the gastro-intestinal mucosa, caused an increase in the visceral blood flow, but did not affect the biliary secretion. Likewise food was injected into the blood without increasing the rate of bile secretion.

Pancreatic secretion is similar to that of the bile in most respects, and may sometimes be a gall stone factor. Anatomically, the duodenum, the cysto-hepatic and pancreatic ducts are lined with continuous mucosa containing columnar cells, that secrete mucin or a nucleo-albumin. In the duodenum this mucin is the well-known "secretin," with its enterokinetic action. From analogy we must conclude the secretion and excretion of both bile and pancreatic material are governed by a cysto-hepatic and pancreatic "secretion." Also that these various "secretins" are hormones controlled by autacoids or chemical messengers sent from the posterior pituitary body. These autacoids are probably hormones or stimulators so long as secretion should be increased, and later become chalones or inhibiting chemical messengers when secretion should be checked. The inhibitory chalone may come from the suprarenal principle, which in its turn has been activated by the pituitary hormone. Certain it is, the secretion of bile is controlled entirely through the blood influence, since all the hepatic nerves may be divided without affecting biliary secretion. It is likewise certain the pituitary principle excites peristalsis similar to duodenal secretion. Hence, it appears a posterior pituitary hormone conveyed by the blood activates these cysto-hepatic "secretins" or hormones causing both the rhythmic contractions in the gall bladder and the non-striated ducts, and the increased rate of bile secretion. The part played by the thyroid secretion and by the calcium electrolyte, just here, has not been interpreted.

Cholesterin, the chief ingredient of most gall stones, is a mono-atomic, unsaturated, secondary alcohol. Its formula is now regarded as $C_{27}H_{46}O$, and it belongs to the terpenes. It occurs in nearly all animal fluids; it is especially abundant in the brain. It is also found in tuberculous masses, pus, old cysts, tumors, etc. It appears to be a product of systemic metabolism that is largely excreted by the liver and epithelium of the bowel.

Cholesterin belongs to the now popular class of lipoids, i. e., "substances that cannot be saponified as fats, but may be extracted by means of ether, chloroform, alcohol, acetone," etc. Lipoids possess a detoxicating action. The power of the liver to combat poisons depends greatly upon its lipoids. Cholesterin protects the red blood cells; it prevents the hemolytic action of saponin and certain other bodies. Cholesterin is held in solution in the various fluids by lecithin and alkaline salts of the fatty acids. Cholesterin is found in greater quantity in the bile of the gall bladder (1 per cent.) than in that of the ducts (.16 per cent.). It is four times as abundant in the pregnant as in the non-pregnant. In the young lecithin is usually present in double the quantity of cholesterin.

The second important constituent of biliary calculi — bilirubin-calcium — is sometimes amorphous and sometimes crystalline. It occurs in animal fluids as a soluble alkali-bilirubin. It is slightly soluble in ether, benzine, carbon-disulphide, amyl alcohol, fatty oils, and glycerine; it is more soluble in alcohol and chloroform. Super-saturated solutions are easily formed.

Thus it may be seen biliary calculi are allotropic forms of normal bile constituents. Gall stones, however, never form in normal bile. If the outflow of bile be stopped, mucin or the "cysto-hepatic secretin," which should be used up in the performance of its function of stimulating contractions, accumulates in the gall bladder. Mucin causes stagnated bile to putrefy. Putrefactive changes in bile destroy its anti-septic action, and thus micro-organisms are permitted to live and excite the so-called lithogenic catarrh of the cystohepatic mucosa.

Lecithin, which is the chief factor in preserving the fluidity of cholesterin, is broken up by bacteria, acids and alkalis into substances no longer capable of holding cholesterin in solution; wherefore the precipitation of cholesterin concretions. Mucin is acid in reaction, hence in biliary stasis its accumulation alters the reaction of the bile.

It has been shown that alkali bilirubin-calcium may exist in supersaturated solutions. Consequent upon lowering the alkalinity of the bile by acid mucin, bilirubin-calcium must be precipitated.

The changes produced by bacteria are probably chemical, since the inflammation excited causes the epithelium to discharge sero-albumin and lime salts.

The calcium molecules furnish the electrolytes; a foreign nucleus is found, and by electro-synthesis a laminated calculus is formed which varies in degrees of crystallization, probably according to the age of the stone.

The same position is adhered to now, as in the paper upon this subject read before the Kentucky State Medical Association, in 1907; namely, that by far the greater number of gall bladder disorders occur from chemical reactions due to faulty metabolism. (Even when micro-organisms are present, it is believed precipitations are produced by chemical changes.) This is borne out by the fact that the smaller percentage of calculi show bacteria, also that gall stones occur most frequently in the periods and under conditions most characterized by disturbed retrograde metamorphosis, with organic acids in the system. Thus in pregnant women stasis is more apt to occur, and the bile contains four times as much cholesterin as normal. Yet the resistance to bacteria is relatively high.

Thus the great predisposing causes of biliary concretions may readily be seen to be all things favoring biliary stasis, as gastro-enteroptosis, tight lacing, occupational pressure, as in the cobbler, etc., etc. Likewise the age, hygiene and food conditions favoring acidemia, and disturbances of metabolism. Organic acids in the system liberate calcium in the circulating fluids of the body; calcium in the bile, by its electrolytic and chemical actions, breaks up the lecithin, unites with the fatty acids, changes the reaction of the bile, and causes precipitants. Certain colloids are thus precipitated. Hence, a gouty diathesis is a strong predisposing factor. Likewise a disturbed hormone balance due to disease of any of the endocrinous glands, especially the thyroid and ovaries.

Degenerative changes in the liver, gall-bladder and ducts, and in the intestines, have been observed after thyroidectomy by Lorand, Bouchard and Neusser. The apparent explanation of this probably also includes the relation of the splanchnic nerve. The abdominal visceral circulation is controlled by the splanchnic nerves. Their vaso-dilator effect is probably dependent upon the thyroid secretion. Naturally a constant diminution of blood to these structures (due to the absent thyroid) would be attended by visceral atrophy. Hence, the pituitary hormone, activating the secretin hormone, will still require the thyroid hormone to enable an adequate blood supply for functional activity.

Upon these postulations we would expect, and do observe, the following phenomena: In all conditions attended by cholesteremia, acidema, bacteremia, and biliary stasis, the early manifestations of cholelithiasis may be anticipated. The most frequent of these occurrences are: pregnancy, menstruation, the period of retrograde metamorphosis, states of disturbed hormone balance, as in cretinism, etc., infectious diseases, habits favoring biliary stasis and gastro-enteroptosis or other biliary obstruction.

The early symptoms are: headache, malaise, disturbances of digestion, especially those due to absence of secretion—gastric, duodenal, pancreatic and biliary—diminution of bile in the stools, urinary concentration and toxication, and possibly bile pigment in the urine. There may be a sense of discomfort, and sometimes pain, in the epigastric region. This is the time the "innocence of the general practitioner" in not observing the "innocent stone" is only equalled by the innocent surgeon who cuts down and finds no stone.

Jaundice has excited a great deal of discussion. In the light of the biliary changes that we know occur during biliary stasis, it may be stated biliary concretions need not necessarily form when normal bile is held in the passages. Since the addition to the bile of added waste products, of acid nucleo-albumin or secretion, and also of bacteria, are very likely to occur during stasis, the conclusion must be that precipitations are certainly greatly favored by stasis. Concretions thus formed may or may not be passed out as soon as the occlusion is overcome. Furthermore, the liver secretes bile under relatively high pressure, hence it continues to secrete bile and pass it into other liquid channels after its own outlets are closed, consequently jaundice; and possibly this, too, is the reason for the cardiac arrhythmia so often observed both in jaundice and gall stones.

Often a calculus may entirely fill the gall-bladder and yet no symptoms be observed. If it be true that the gall-bladder contractions are due to a gall-bladder secretion, it can be seen how the atrophy of these glands from pressure would cause both the cessation of bladder secretion and contractions.

Gall stone colic is universally regarded as due to impingement of the ducts upon calculi; hence, bile and secretin to stimulate contractions must be present in those cases, and therefore pain should be regarded as a favorable symptom. Of course if jaundice be present, clay stools denote the absence of bile; however, jaundice is sometimes absent, and clay-colored stools present. This should be regarded unfavorably, since we recognize the absence of the secretion as well as secretin, and the liver itself is involved.

When jaundice is present the symptoms become those of cholemia, the urine contains bile, and the nervous phenomena are all accentuated. As to the relative elimination of cholesterin by the intestinal epithelium during jaundice, we would expect an attempt at compensation on the part of the bowel. In those cases in which gall stones are spontaneously thrown off, the natural secretions have probably reached that point in their effect upon calculi of long standing that disintegration and expulsion occur entirely from the natural bile solvent and bile expelling mechanisms; hence, a favorable prognosis in these cases.

Fever in uncomplicated cholelithiasis is rare. Suppurative cholecystitis is apt to exist if chills and fever are present. This condition is possible when bacteremia exists, or rarely from intestinal infection.

In regard to the possibility of "gall stones running into cancer": We might talk as intelligently of "malaria running into typhoid." Cancer of the biliary structures is almost certain to be attended by gall stones, because of the products of inflammation, the altered secretions, and stasis. Personally, I have never seen a case of recognized gall stones in which it could be said a malignant growth developed after the formation of the biliary concretions. Malignant growths complicate gall stones in from four to fourteen per cent. of cases. Gall stones complicate malignant growths of the gall bladder in more than ninety per cent. of cases.

The treatment of cholelithiasis is prophylactic, palliative and curative. Prophylaxis embraces care of the pregnant and menstruating woman, of infectious fevers, of toxemia, of diathetic, hygienic, occupational and anatomical factors.

In all gall stone cases, as well as in those predisposed, the diet should be such as tends to minimize the organic acids, and increases the oxygen in the system; hence, all lentils, white meats, milk, especially butter milk, and hot white meat broths or certain vegetable soups; large quantities of hot mineral or plain water, especially an hour or so before breakfast. These hot fluids, even starvation diet, promote the secretion and excretion of bile, and thus freshen and strengthen bile secretions and hepato-cystic contractions. Contrariwise, no tea, chocolate, tomatoes, strawberries, bananas, cantaloup, red meat, nor yeast bread, should be permitted.

Butter milk makes the ideal food; it stimulates the flow of secretin, it is rich in lecithin, and lessens the organic acids in the system. An abundant use of saline or pure water may avert the cholesteremia of pregnancy and the menstrual periods.

Both the feces and urine should be constantly observed. In infectious fevers and toxemic conditions the secretion and elimination of bile should be observed and stimulated from time to time, especially by the true benzoates and salicylates; urotropin is also serviceable. Gastro-enteroptosis, floating kidney, or other anatomical factors should be corrected. Occupational habits may be reversed; and diathetic defects overcome by favoring oxidation.

Palliative treatment embraces the care of the acute colic or sudden symptoms that may arise. Often curative treatment instituted at once will relieve the acute attack. The pain, the digestive disturbances, and sometimes the heart action, demand especial care. The acute gall stone colic must be from the impinging of the gall bladder and ducts against calculi; hence, such measures as quiet the rhythmic or spasmodic contractions promote biliary secretion and favor cholesterin disintegration are indicated.

Valerianate of amyl quiets the spasm of the gall bladder musculature, stimulates the heart action, and has wonderful solvent effect upon cholesterin. Both are alcohols of the terpene class. Olive oil, glycerine, and most lecithin-bearing substances exert solvent action upon the cholesterin and quiet the gastralgic manifestations. Two pints of hot cottonseed oil as an enema will often overcome the spasm. Virchow and Thoma and others have shown that lecithin, oleic acid and other fats are eliminated by the epithelium of the gall bladder; hence, the action of olive oil and its class not only in disintegrating cholesterin concretions, but also in relaxing the bile ducts.

Morphine is rarely necessary if the foregoing medication be supplemented with abundant ingestion of hot water. Morphine retards secretion, delays elimination, and makes more difficult the effect of curative remedies.

The curative treatment embraces many drugs that possess similar effects. Few thinking minds of today question the disintegration of cholesterin concretions. The question of medicine or surgery is very clear, very definite, and no more conflict of thought should occur than in the question of when to amputate the leg. The disintegration of cholesterin means the breaking up of nearly all gall stones, since most gall stones possess cholesterin in at least eighty per cent. The bilirubin-calcium is left then to be expelled in the form of bilesand.

The *x*-ray rarely radiographs cholesterin concretions, but the calcium concretions will be skiagraphed. Acute suppurative cholecystitis or cholangitis may demand drainage at once. Therefore, the indications for surgical intervention are failure to get immediate results from proper medication, especially in those cases complicated by suppuration, and those cases showing positively by the *x*-ray.

The aching and pain of adhesions may persist some time after the evacuation of gall stones. Many experienced surgeons have been greatly chagrined by cutting down upon a clean gall bladder that showed only adhesions.

Medical treatment has definite purposes to accomplish. After the attack has been quieted, such medication as will best break up the concretion is to be administered. Lecithin, the oleates, the bile salts, valerianate of amyl, the succinates, all enrich the solvent power of the bile, and are excreted into the biliary passages by the lining of epithelial cells. Secretin causes an increase in the secretion of normal bile and stimulates the expelling mechanism; hence, it should be administered before meals, i.e., at the time normal secretion and rhythmic contractions should normally take place. This may be judiciously repeated anywhere from the ingestion of food to the fourth hour. Since thyroid secretion increases the flow of blood through the abdominal viscera, it should be administered at the same time as the secretin, that the function of the secretory organs may be assisted. If it be necessary to administer posterior pituitary secretion, it should likewise be given at the time rhythmic contractions should be stimulated.

Dioscorea villosa both relieves the pain and spasm and favors the expulsion of the stone. It should be used in about twenty drop doses of the fluid extract and administered during this same period—from ingestion of food to the maximum of elimination. Carduus marianus, cambogia and chionanthus possibly favor visceral blood supply, and in this way assist cysto-hepatic tone.

Fabiana imbricate, or pichi, is perhaps the most active of any drug now possessed in its effect upon the mucosa. It promotes secretion, "modifies or cures chronic purulent discharges of the mucous membrane" (Shoemaker), and causes disintegration of the mucin in calculi. It is well borne by the stomach, and best administered in soft capsules containing three or five minims of the oleo-resin. Hydrochloric acid and the chlorides, we now understand, stimulate secretin and should be used accordingly. Carlsbad and the mineral waters not only favor a normal bile flow, but lessen the organic acids in the system. Sodium phosphate is the best of all the alkaline aperients, because it is eliminated with the bile (by the bile epithelia), thus increasing the fluidity and alkalinity of the bile.

Thus treatment may be outlined: Two hours or more before breakfast, copious draughts of hot sodium phosphate solutions, possibly with a capsule containing three or five minims of valerianate of amyl; just before breakfast a full dose of some secretin preparation; twenty drops of the fluid extract of dioscorea may be administered at this time, and the patient instructed that the disagreeable sensations arising in the stomach simply show the desired stimulation is being obtained. In fatty subjects thyroid secretion may be administered in small doses. In cases with arhythmia the posterior pituitary substance should be administered, preferably an hour before meals.

Two hours or more after meals the lecithin-bearing drugs, as glycerine and olive oil, may be administered. Bile salts, succinates, the benzoates or salicylates, when administered, had best be given at this time also. Pichi may be given after meals, preferably with hot water. Carbonated waters should not be given.

At bedtime larger quantities of lecithin and the fatty acids may be given; also the enema of two pints of hot cottonseed oil about every third night. This will often be retained until morning. Urotropin is serviceable in cases of infection, in suppurative cholangitis, and cholecystitis.

While time is required to effect complete disintegration and expulsion of some biliary concretions, favorable indications are often observable immediately. Jostling upon trains, etc., should be avoided, and the diet insisted upon.

The points to be summarized are:

(1) That biliary concretions, for the most part, are composed of cholesterin, which is a normal constituent of bile, a mono-atomic alcohol easily broken up by again restoring bile to normal.

(2) That cholesterin precipitation occurs only in stagnated, decomposed bile.

(3) That the rhythmic contractions of the gallbladder musculature is probably due to its secretin, which is similar to the secretin of the duodenum.

(4) That medication should aim to alkalinize the bile, stimulate the bile secreting and excreting mechanisms by activating biliary secretin, and aid biliary antisepsis and mucosa tone.

(5) Also that necessary surgery is in no way deprecated.

Kidney Infections.

"Physical examination will show some tenderness over the pubes in acute cystitis. In kidney infections the physical findings are insignificant when compared to the general symptoms. If the infection is acute there is usually some tenderness over the kidney, and sometimes, in thin individuals, the kidney may be palpated, but not, as a rule, unless the kidney is enlarged. If one can feel an enlarged or even a tender kidney, it is worth a great deal in making a diagnosis. In most cases the kidney cannot be felt, and in most of the chronic cases there is very slight tenderness."—W. W. Cobb in the *Texas State Journal of Medicine*.

ACCIDENTS DURING AND FOLLOWING GENERAL ANESTHESIA.*

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Anesthetic accidents may be classified as *primary* and *secondary*, or immediate and remote. Under primary or immediate would be classified those accidents which occur during induction of narcosis and those which occur during surgical anesthesia. In the secondary or remote group would be classified accidents which occur after the completion of the operation. In the first group would be placed death, temporary cessation of respiration or circulation, injury to the tongue, teeth, pharynx or eyes, dislocation of the jaw, ether spray entering the pharynx or trachea, and rupture of the lung by overdistension as in intratracheal insufflation anesthesia. In the second group would be placed pneumonia, acid intoxication, nephritis, peripheral and central paralysis, nausea, vomiting, and hiccough.

DEATH UNDER ANESTHESIA.

Death, the most unfortunate and terrible of all accidents, occurs in the hands of the most expert and careful anesthetists, and this is especially true if chloroform is being or has been administered. However, it cannot be gainsaid that many deaths are due to a lack of training, carelessness or a too great confidence in the safety of the agent being administered. Those who are not observant or attentive to detail in other branches of medicine, although properly trained, will never make first-class anesthetists, either from the viewpoint of the patient's welfare or the surgeon's comfort. Deaths during narcosis, which are not due to hemorrhage or when the patients are not moribund on entering the operating room, are due to the anesthetic. Deaths due to operative measures occur after the patient has been returned to bed. There are recorded a few deaths on the table from cerebral hemorrhage in patients suffering from sclerotic arteries, or due to central paralysis caused by an overdose of the anesthetic or to morphin acting upon the respiratory center, or to cardio-vascular paralysis produced by a toxic dose of the anesthetic, or to cerebral anemia caused by the sudden sitting posture in which patients are occasionally placed for head, throat, or chest dressings. In choloroform toxemia, the arterial tension is so lowered that the blood supply to the respiratory center is reduced, and breathing fails from this cause as much as from the sedative action of the anesthetic. Death may also be due to asphyxia, as in administering nitrous-oxid with an insufficient amount of oxygen. An overdose of nitrous-oxid always induces muscular spasm within or about the air passages, so this respiratory failure is of a different type from paralytic respiratory failure.

When chloroform is being administered and death occurs during the induction of the narcosis, it is usually due to a too concentrated vapor, especially if the patient has an enlarged or fatty heart, or if he struggles or holds his breath and then inspires deeply. The extra amount suddenly brought to the heart may paralyze it. Dilatation of the sphincter is usually accompanied by deep inspiration which makes chloroform dangerous at such a time. This danger is practically nil if ether is being administered. For these reasons it is much safer to induce narcosis with ether, even though it should be desirable later to employ chloroform. With modern appilances for the administration of ether by vaporization, the field of usefulness for chloroform has been very materially lessened.

OBSTRUCTED RESPIRATION.

Obstructed respiration may be caused by the tongue falling back in the pharynx. This accident will never occur if the head is kept turned well to the side. However, it is often impossible in short, fat, thick-necked subjects to turn the head to the side, and to add to the difficulty, when the patient is placed in the Trendelenburg position the tongue frequently becomes much swollen, practically filling the mouth. In the throat enlarged tonsils, inflammatory swellings of the neck, retropharyngeal abcess, and foreign bodies in the mouth are all local causes of obstructed respiration. In the nose, collections of adenoid tissue, deflected septum or tumors, and swelling of the mucosa of the turbinate bones may obstruct respiration by completely blocking the airway if the mouth is kept closed. Any condition which narrows the air passages may, on account of the congestion due to the anesthetic and aggravated by the position of the patient, completely obstruct respiration. In such an event, a mouthgag should be inserted and the tongue gently drawn out, which will carry the epiglottis forward, making a clear airway. Care should be taken not to injure the tongue on sharp, ragged teeth; furthermore, forceps should not be used on the tongue because of the great suffering caused by such a mutilating practice. By placing a piece of gauze over the first finger and thumb, the tongue may be easily grasped and held out without injury. By placing the fingers behind the angle of the jaw and pushing it forward, a free airway is usually obtained, unless the alveolar processes are absorbed, in which case the lips may close and act as a valve, preventing the entry of air, especially if the patient has nasal obstruction. Usually holding the lips apart suffices, but it may be necessary to draw the tongue out. In the larynx, trachea, and bronchi, obstruction may be due to foreign bodies, blood, or fluids coughed up from the chest, as in lung abscess, or vomited from the stomach and aspirated back into the air passages. Spasm of the glottis may occur with ether or chloroform and during light or deep narcosis. It may be distinguished from other forms of obstructed breathing by the peculiar *crowing* sound due to the narrowed orifice. This condition is brought about by the administration of a too concentrated vapor and is relieved by allowing all air for a short time or by a less concentrated vapor. Enlarged thyroids or tumor masses may press upon or deflect the trachea and interfere with breathing, or the gland may be so adherent to the trachea that, in removing it, traction completely obstructs respiration In such an event, operative procedure must be occasionally suspended for a few moments till the blood is reoxygenated.

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*Read during the Third Annual Meeting of the American Association of Anesthetists, San Francisco, Cal., June 21, 1915.

The diaphragm is the most important muscle of respiration, and its movements should not be impeded. The lithotomy and Trendelenburg positions may dangerously hamper respiration in the obese and emphysematous. Any condition within the chest or abdomen which interferes with the proper movements of the diaphragm, as pleurisy with effusion, large abdominal tumors, free fluid, and marked tympanites, all mechanically affect respiration. Under such conditions the blood oxygenation may be sufficient while a patient is conscious, but becomes insufficient under a general anesthetic. The question as to whether respiration or circulation ceased first occasionally arises and it has been urged that inasmuch as the conclusions of the Hyderabad Commission were based upon investigation with healthy animals, the results are not comparable to what might occur in sick human beings. With this thought in mind, I recently anesthetized to death with ether and chloroform animals (dogs and rabbits), which had been used for experimental bacteriologic studies, and others which had been used in teaching operative surgery in Rush Medical College. These animals could hardly be considered normal. With a single exception there was a primary arrest of respiration; however, there were several instances in which the cessation of respiration and circulation might have been thought simultaneous, if such close observation were not being made. These findings are in accord with the conclusions of both the Hyderabad Commission and many private investigators.

It is unsafe to transfer anesthetized patients from one table to another, especially if they are obese and have myocardial degeneration, or if the lung capacity is limited so that normal respiration is hindered. In suspended respiration a clear airway must be secured and maintained, all clothing removed from the chest, and the diaphragm watched for movements. If moving ever so slightly, artificial respiration should not be employed because of the impossibility of coördinating the movements, and consequently more harm than good would be done. If the diaphragm is moving the chest wall should be grasped and compressed during expiration and then suddenly released. The elasticity of the chest wall produces an expansion when pressure is relieved and air rushes in. This procedure should be continued till breathing is well established. If, however, the diaphragm stops, artificial respiration must be resorted to either by the Sylvester method or by using one of the mechanical contrivances on the market for forcing oxygen into the lungs. Capps and Lewis[1] were able to resuscitate thirteen out of sixteen dogs by passing a hard rubber tube into the trachea and "by means of a pump air was forced 15 to 20 times a minute into the lungs. A T-tube in the rubber connection provided for the escape of air between inflations and also controlled the pressure of the air during inflation." As long as the heart continues to beat an endeavor should be made to reëstablish respiration. There are several instances recorded where efforts have been crowned with success after two or three hours of artificial respiration. Dilating the sphincter and rhythmical traction on the tongue are sometimes of value.

To reëstablish circulation is more difficult than to reëstablish respiration; however, rhythmical compression of the heart either directly or indirectly through the diaphragm has been reported as successful in several instances. The abdomen has been opened with that object in view or the procedure has been resorted to during abdominal operations. Fifteen minims of the 1 to 1,000 solution of adrenalin may be injected directly into the heart muscle to stimulate contractions.

Should the anesthetic be accidentally dropped into the eyes, castor or olive oil if instilled immediately into them will in a measure prevent burning. Wet cotton makes a better protection for the eyes than wet gauze. Severe eye infections and corneal ulcers have developed from the unpardonable practice of touching the cornea for reflex action. When using vaporizing devices, care should be taken that they are properly adjusted: otherwise a spray instead of a vapor may enter the pharynx or trachea. Occasionally in mouth and throat operations the jaw becomes dislocated. This accident is easily corrected while the patient is still asleep. Watching the amount of pressure as indicated by the manometer will prevent overdistension of the lungs in intratracheal insufflation.

SECONDARY OR REMOTE ACCIDENTS.

The secondary or remote accidents may be slight and may produce only a temporary disability, or may be severe and terminate in death. Those most to be feared are pneumonia, renal complication, acid intoxication, and paralysis. Pneumonia occurring after operations should be termed post-operative rather than post-anesthetic. In a certain sense, post-anesthetic is correct, but it is misleading, as the majority of lung complications are independent of the anesthetic. In 1896, Gottstein[2] studied a series of cases in von Mikulicz's clinic in Breslau. His conclusions were especially interesting, as up to that time it was quite generally supposed that all pneumonias which occurred after operation were due to the local action of the anesthetic, and it was thought that by using local analgesia this accident could be eliminated. He showed that as many cases developed under local as under general anesthesia. Clinical reports indicate that with the possible exception of mouth and throat operations, lung complications most frequently follow abdominal operations, especially stomach, gall-bladder, and pelvic work, with carcinoma of the stomach furnishing the largest mortality regardless of the nature of the operation. According to Wright's[7] report, 75 to 95 per cent. of all pneumonias are of the lobular type, and the right lung is most frequently involved. Other lung complications which occasionally occur are abscess, gangrene, emboli, and thrombosis. True bronchitis is seldom seen. Undoubtedly embolism and infarctions play an important rôle. Homans[8] reported the consolidation of an entire lobe following pulmonary embolic infarction. This author says: "If such instances of obvious embolic infarction occur, may not others unrecognized serve as the origin of pneumonia, abscess, or gangrene?" Bibergeil[9] reported a case of lobar pneumonia in which multiple emboli were found in the pulmonary artery. Emboli may develop from 12 hours to 3 or 4 weeks after operation. Aspirations from the mouth or pharynx of foreign substances, both solid and liquid, weak heart action with low blood pressure producing hypostatic congestions, generalized sepsis, cooling of the body surface, diminished lung expansion, morphin which allays the reflex excitability of the air passages, thereby favoring the retention of aspirated materials — all contribute their quota to lung complications.

Offergeld,[3] using rabbits, cats, and guinea pigs, administered ether alone with a closed cone, ether combined with oxygen and ether by the *drop* or *open* method, and studied the pathologic changes which took place in the lung epithelium. The results of his study clearly showed the much less injurious action of the anesthetic when given by the open method. There were no deaths and autopsy after two days showed a normal condition, contrasting with the condition found after the closed methods were used, where the mildest cases required several days for repair.

PROPHYLAXIS OF PULMONARY COMPLICATIONS

The following measures may be suggested for preventing lung complications: aseptic technic and minimum traumatism to the tissues during operation would decrease the possibility of thrombosis and embolism. Open method of etherization, allowing as much air as is consistent with narcosis, together with an even administration. The anesthesia should be as light and short as possible. No solid food should be allowed for at least six hours before operation. The stomach contents should be aspirated in emergency operations. The mouth, teeth, and throat should be disinfected as far as possible with a mild wash containing alcohol. The head should be kept turned to the side to allow mucus to escape and prevent the aspiration of vomitus. The operating table should be covered by thick pads and the patient by blankets to prevent loss of body heat, both during the operation and when being conveyed through halls and elevator shafts. Resistance is always lowered during and after operation, hence patients are more susceptible to temperature changes, and for this reason they should be well protected. In mouth, jaw, and throat operations an early awakening from the anesthetic is desirable so that a semi-recumbent or sitting position may be assumed. This very materially assists in clearing the bronchi of aspirated blood or pus.

Beesly[4] says that: "By quantitative estimation a trace of acetone is generally found in healthy urine which cannot be detected by color tests. Acetonuria of varying degrees follows the administration of every general anesthetic, but symptoms of intoxication only occur when the kidneys are failing to excrete the acetone: and when death follows, it is due to the inability of the kidneys to cope with the increased formation of acetone by a corresponding capability of excretion." He further states: "That although ether may produce a greater acetonuria, this is less harmful than that produced by chloroform, because ether is less injurious to the liver and kidney cells and thus does not hinder their power of elimination."

He distinguishes an acute and chronic form of acetonuria and concludes that the usual risks of anesthesia are not increased by a preëxistent chronic acetonuria, but that anesthesia is dangerous with a preëxistent acute acetonuria, especially if chloroform is given. The length of the operation does not appear to influence the production of acetonuria, but it is more apt to develop after repeated chloroform administrations. In a series of 202 cases, Rice[5] found acetonuria in 90 per cent., but only about 10 per cent. showed symptoms, and in only two were the symptoms at all serious. He observed that "diacetic acid was never found unless acetone was also present, and that of the cases with acetone and free from symptoms, none showed diacetic acid." In a series of cases studied by Osgood[10] it was found that when ether was given by the closed method, 88½ per cent. of the cases showed acetone, while with the open method only 26 per cent. showed acetone. Young and Williams[6] found 75 per cent. with the closed method and 47.7 per cent. with the open method of etherization. Inasmuch as acetonuria is an acid intoxication, the rational treatment is the administration of alkalies. Bicarbonate of soda in large doses has been found most efficacious. On account of the vomiting in severe intoxication, medication per stomach is impossible, but slow and continuous rectal administrations have proved very satisfactory, or in desperate cases it may be given intravenously. Glucose is objectionable to many people and appears to be of less value than bicarbonate of soda. A meat-free diet for a couple of days with an abundance of carbohydrates and sufficient alkali to produce an alkaline urine, as suggested by J. J. Hogan, has been found beneficial as a prophylactic measure. This simple preparation renders the patient less liable to post-operative vomiting and the development of acidosis, particularly if the kidneys are at all incapacitated. Delayed chloroform poisoning has been attributed to a *fasting acidosis*.

The action of anesthetics upon the kidneys has been studied both clinically and experimentally. During narcosis the secretion of urine is usually more or less suppressed, but becomes reëstablished very soon after the anesthetic is withheld. There is an occasional transient albuminuria following both ether and chloroform. It is claimed that healthy kidneys are more apt to be affected by chloroform than by ether, and that the effects are more lasting. Many observers believe that ether albuminuria is due to a vasomotor disturbance rather than to a local irritating action. The degree of concentration of the vapor and duration of the narcosis play an important part in the effect on the kidneys as well as on the lung epithelium. It has been my observation that in chronic nephritis, if the albumen is increased at all, it is only for a day or two. However the amount of urine being secreted is of greater import than the albumen.

PARALYSIS.

Paralysis may be central, due to cerebral hemorrhage, or local, due to posture. Nerve roots or nerves themselves may be so compressed or stretched that paralysis of varying degrees results. If the arm is abducted and drawn upward a paralysis of the brachial plexus may occur. Another form of paralysis may arise from allowing the arms and hands to hang over the sides of the operating table so that the musculospiral nerve becomes compressed between the bone and table edge. Esmarch bandages or pressure of straps in the lithotomy position may also produce sensory or motor paralysis. Complete recovery usually takes place within a few days or weeks, although disablement may last for a year or longer. Sensation returns before motion.

VOMITING.

Long and persistent vomiting after operation prevents the taking of food and entails so much discomfort and exhaustion on weakly subjects that the importance of its consideration is obvious. An effort should be made to ascertain the cause of vomiting, and select remedies accordingly. The anesthetic may be the sole cause, may be only a contributing factor, or not at all responsible; therefore, the expression *post-anesthetic vomiting* like *post-anesthetic pneumonia*, while literally correct, conveys the wrong impression. Among the predisposing causes may be mentioned faulty preparation of the patient, administration of morphin before anesthesia, improper administration of the anesthetic, swallowing of blood or pus, faulty after-care, reflex irritation, faulty operative technic, nervousness, acute dilatation of the stomach, development or the augmentation of a preëxisting acidosis, and the condition which made the operation necessary. Purging and too strict limitation of the diet before operation are not to be recommended, as they exhaust the patient and disturb metabolism. Patients should not be allowed solid food, milk or chocolate for at least six hours, nor liquids, tea, coffee, or broths for two hours before a general anesthetic. There are people who are unable to take morphin without nausea or vomiting, and if such persons are given it before operation, vomiting usually appears several hours after the operation, or at a time when it would probably have disappeared if due to the anesthetic. Uneven or intermittent administration with an insufficient amount of oxygen or air to keep the blood oxygenated increases the tendency to vomit. When vomiting is due wholly to ether, olive oil, as suggested by Graham, is undoubtedly of value. Water strongly acidulated with lemon juice and used for a mouth wash and gargle will assist in overcoming the taste and smell of ether. Cracked ice held in the mouth, teaspoonful draughts of hot water, black coffee alone or with bicarbonate of soda and champagne have been found beneficial. Calomel or enemas to establish a downward peristalsis, causing gas to escape or an evacuation of the bowels, will frequently give relief. Counter-irritants, as mustard on the epigastrium, may be of value in neurotic patients, or it may be necessary to administer a sedative as bromid per rectum. If morphin is well borne, it usually is of value in this class of patients, especially if there is much pain, but it must not be forgotten that it is apt to produce flatulency and constipation.

After mouth, jaw, and throat operations, a considerable quantity of warm water, to which bicarbonate of soda has been added, will assist in clearing the stomach of swallowed blood or pus through emesis or by washing the contents into the bowel. If food or drink is allowed too soon, it may cause vomiting when none has existed before. Reflex irritation may be responsible for vomiting as pressure from drainage tubes or clamps following operation upon the bile tracts. The vomiting which follows faulty technic, as in gastro-enterostomies, when a vicious circle develops, persists till the condition which produced it is corrected. If an acute dilatation of the stomach develops, nothing short of lavage will be of any benefit. This may be followed by a hypodermic of phyostigmin gr. 1/100 to 1/50, or strychnin sulph. gr. 1/30. Finally, the persistent vomiting of acidosis which must be mentioned is relieved only by the measures employed to combat the acid poisoning—bicarbonate of soda in large doses. Fecal vomiting ceases only when the obstruction which caused it is removed.

In intestinal obstruction and when considerable quantities of blood or pus have been swallowed it may be advisable to wash out the stomach before consciousness returns. Defective elimination of the anesthetic may be produced by hampered chest expansion through pain, tight bandaging or position. Neurotic patients occasionally develop hiccough after general anesthesia. Cocain alone or combined with atropin has been recommended and appears of value.

MEDICO-LEGAL CONSIDERATIONS.

A few remarks regarding the legal aspect of anesthetics may not be out of order. The legal responsibility for the administration of anesthetics has received little attention in the United States. It seems a travesty on justice that according to law no one but a licensed physician is allowed to prescribe drugs or perform the slightest operation, but persons with absolutely no training are administering anesthetics without hindrance, and yet there is no medicine which possesses greater power for harm than these drugs. This laxity has been largely due to a lack of interest in anesthetics quite generally felt by the profession. Too many deaths have been charged to the idiosyncrasy of the patient rather than to improper selection and administration of the anesthetic. Every one who administers anesthetics assumes a moral and legal obligation. The moral responsibility is to select the agent best suited to the physical condition of the patient and the operative requirements of the surgeon and to administer the same with the minimum of ill-effects. The legal responsibility is to show he is a regularly qualified physician and has administered the anesthetic according to recognized methods. It is assumed that he has a certain amount of skill and experience. In England an expert anesthetist may be called upon to testify as to whether the operator is a legally qualified person and whether the operation performed is a legal one. If he administers an anesthetic for a person whose name is not on the medical or dental register he is guilty of the offense of *covering* and becomes liable to punishment. If he knowingly administers an anesthetic for an illegal operation he becomes an accomplice. In case of death during an operation the anesthetist, not the surgeon, is usually called by the coroner to testify. At present in this country the surgeon is held responsible for all that pertains to the operation. The justice of this must be questioned. Undoubtedly he should be held responsible for the competency of his assistants to perform the duties assigned them. This moral obligation might involve the legal point as to their knowledge and fitness to perform the work entrusted to them. With these questions satisfactorily settled it appears only just that his responsibility should end, and the investigation be directed toward the individual actually responsible for the accident. Through the efforts of a few conscientious physicians who are extending their work along research channels, the immediate and remote effects of anesthetic agents are becoming known, and surgeons are slowly but surely coming to realize how important a part the anesthetic plays in their operative results. With the education of physicians comes very naturally the education of the people. Already (at least in Chicago) the prospective patient not infrequently selects his own anesthetist. This practice will be common when people realize not only the greater comfort, but what is more important, the greater safety when in the hands of a trained anesthetist.

Faulty administration and impure agents rather than idiosyncrasy are responsible for many of the untoward effects. Practical and theoretical instruction in the selection and use of anesthetics should be made an obligatory part of the curriculum in medical colleges. We grant that expert anesthetists, like expert surgeons, must possess special qualifications; still careful instruction will do much to diminish the danger incident to anesthesia.

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The Percy Heat Treatment of Uterine Cancer.

It is utterly impossible to apply heat to the pelvic organs for the purpose of destroying cancer in the most effective way without opening the abdomen. With the abdomen open, the surgeon is at once made acquainted with the problem before him. More than this, he knows what degree of heat he is using, and more important than all else, he sees or feels just where he needs to apply it. Opening the abdomen in order to more effectively apply the heat and coagulation of the tissues involved in the malignant process—rather than carbonization—are two very important elements in the successful application of the technic here outlined.—J. B. Percy in the *Pacific Medical Journal.*

Persistent localized pain and deep-seated tenderness in an extremity may be due to a *chronic, medullary* bone abscess. The roentgenogram will present the appearance of a localized osteo-periostitis. The collection of pus in the marrow cavity is not itself indicated in the plate.

A SIMPLE APPARATUS FOR THE TREATMENT OF INCIPIENT HIP JOINT DISEASE.

Grant Gould Speer, M.D.,
Los Angeles, Cal.

In the advanced cases of hip-joint disease the conditions are very complex, each case requiring such surgical interference as is deemed necessary according to the amount of joint involved, bone destroyed, and the sinuses existing. In the incipient cases, however, the treatment resolves itself into two phases. First, extension to separate the diseased portions of the joint as far apart as possible to keep the painful parts from interfering with each other; and second, to reduce the joint to a state of immobility, which insures complete rest, decrease of inflammation and swelling, and absorption of the inflammatory matter—and in cases where the disease is far advanced to produce permanent complete immobility of the joint. To insure these two conditions a great many braces and apparatus of various sorts have been devised.

The first requisite, extension, is accomplished absolutely, with very little trouble; while the second, fixation, so long as the spine, hip, and knee retain their flexibility, can be only partially accomplished. But even as incomplete as this immobility may be, the results sought are accomplished, *viz.*, rest and complete stiffness of the hip joint.

I wish to present here an apparatus which, as far as I know, has never hitherto been described. It consists of two parts, one for night and the other for day use. That for night use is of the ordinary knee extension apparatus, for use in bed. It consists of a boot formed of plaster or any other material that can be fitted to the foot and leg, as far as the knee, ending in a bale, and split so that it may be taken off and put on as needed. To this is attached a cord, pulley, and a weight sufficient to relieve the child from pain and the usual night cries during the time it should be asleep.

For the day apparatus are required an ordinary well-fitting pair of shoes. On the bottom of the shoe for the foot of the well leg is built a cork extension of from one to three inches according to the size of the patient; on the shoe of the foot of the diseased leg, the heel is removed, and there is substituted a heel of lead, as heavy as the patient can comfortably carry. Added to these is a pair of well-fitting crutches. In a night or two, if the weights are properly adjusted, the night apparatus will be found to give the patient perfect comfort and sleep. In the morning this apparatus is removed, the child is dressed as usual, and is turned out in the air to take exercise and to play with other children, except that he is expected to use his crutches and to keep the foot of the lame leg off the ground.

The objection will immediately be brought forward that while this apparatus performs extension, there is nothing between the foot and the support of the shoulders to keep the hip immobilized. However, one should remember that the line of extension is directly through the hip from the shoulder downward, and in order to steady the heavy weight the muscles of extension, abduction and even circumflexion are exactly balanced. It will be seen that through the muscles being made to work in exact opposition, we have an apparatus that immobolizes the hip even more securely than the so frequently used Thomas splint and its modification.

The first case that this was tried upon was not an incipient but a chronic one, as the destruction of the hip had progressed so far that there was a large number of healed and open sinuses upon which an acute exacerbation had taken place, causing pain, fever and a very much debilitated condition. The parents of this child, who was about eight years of age, objected to the usual cumbersome apparatus from which the child had previously suffered, and a new one had to be devised; the one described is the result.

The treatment consisted of relieving the acute symptoms of fever and pain by such drugs as were needed, and a course of malt and cod liver oil as a tonic. The sinuses were carefully curretted out by means of a small uterine curet, and irrigated thoroughly once or twice daily with a weak solution of iodine and water. The child was encouraged to keep in the open air as much as possible. The results were more rapid than any one could reasonably expect, and in a few months the sinuses were healed, the hip became thoroughly fixed, allowing the child to throw away his crutches; and he was inconvenienced only by a limp.

The second case, of which fortunately there is a radiogram in existence, was that of a young girl, daughter of a mother in the last stages of tuberculosis. She suffered a dislocation of the hip, which apparently healed under rest and extension Later she exhibited the well marked symptoms of incipient hip joint disease. The radiogram showed a wasting away of part of the head of the femur. The apparatus was applied and a full recovery was the result.

The advantages of this apparatus over all others are, its cheapness and availability, for it can be manufactured by any physician with the assistance of a cobbler; its lightness and the ease with which it is borne; the ability of the patient to continue outdoor exercises in the sun and air, which is an important factor in the cure of all tuberculous conditions; and to these may be added the perfect results that can be attained.

THE PECTORAL MUSCLES IN BREAST CANCER

In view of what we know concerning the spread of mammary cancer, of the progressive improvement in the percentage of cures coincident with the adoption of more radical measures, the question arises whether any form of incomplete operation is ever justifiable, particularly when we consider the ultimate result of these inadequate procedures, and the more hopeful outlook following the use of the modern scientific methods producing results which can never be attained by the incomplete operation. I am aware that some authorities at present teach that the pectoral muscle can be spared when not obviously involved, but this is a dangerous teaching as has been shown recently by Lockwood[5] who noted recurrence in the muscle after incomplete operation in three cases. He states that failure to remove the muscle is followed by fifteen per cent. of recurrences, which fact is quite sufficient to justify removal of the pectoralis.—John Speese in *The Pennsylvania Medical Journal.*

COLLES' FRACTURE

Colles' fracture is not an "office fracture," it is a "hospital fracture;" and if the fragment be accurately reduced, the special kind of splint used to retain it is of secondary importance. The problem of a Colles' fracture is one of reduction not retention.

In reducing the fracture we have found that the best results are obtained by placing the hand in the reverse position to that in which the injury was sustained. At the time of injury the hand is hyperextended and pronated. By supinating and flexing the hand the reduction can most easily be accomplished. With the patient completely anaesthetized the forearm is brought to a right angle and supinated. Traction is made upon the hand in the flexed position and counterpressure is made upon the upper fragment.

As this maneuver is done with steady traction and pressure the impaction is broken up and the fragment replaced.—Wm. Francis Campbell in *The Medical Times.*

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WALTER M. BRICKNER, M.D., Editor

New York, September, 1916.

JOHN B. MURPHY.

In the recent death of John B. Murphy of Chicago, at the age of fifty-eight, there was lost to the world one of its greatest surgeons, and to America a distinguished leader—we think we may fairly say the leader—of surgical thought. Measured alone by his greatest individual accomplishments, his name must be written in the glorious history of American surgery with that of the immortal Nicholas Senn. What other surgeon has left to us so many diverse, important achievements?

The metallic button, with which Murphy's name will always be linked, and which he introduced in 1892 as a device for anastomosing hollow viscera without sutures, promptly superseded the various "bobbins" and bone plates and fairly revolutionized intestinal surgery. It was a brilliant mechanical conception based on equally brilliant surgical observations and, although it has been superseded, in turn, by present day accurate suture methods (the evolution of which it stimulated), it is still widely employed, even by the most skillful abdominal surgeons, in cases where haste is a vital factor. So complete and finished was this contribution to gastro-intestinal surgery that in the quarter-century since its introduction no modification has been found necessary in the button itself or in the technic of its employment!

Five years after the description of his button Murphy published the results of his experimental and clinical studies of vascular surgery and described a method of bloodvessel resection and suture. This, too, was a complete piece of work, pioneer work; and although Murphy's method of vessel anastomosis has been quite abandoned, it preceded by so many years the more successful methods of Carrel that it may well be recorded as a brilliant accomplishment in the development of vascular surgery, into the history of which the names of Murphy, Payr and Carrel are woven.

A year later (1898) Murphy advocated the employment of nitrogen in the production of artificial pneumothorax to collapse and splint the tuberculous lung. This suggestion by an American surgeon attracted little attention and the method was not employed here until it came back to us, many years later, from Italy.

The "drip" method of rectal saline infusion which, like his "button," bears always the name of Murphy, shares with the Fowler position first consideration in the routine postoperative management of suppurative peritonitis. Yet the "drip" was but a part of Murphy's conception of the treatment of peritonitis; and his paper on "Perforative Peritonitis," which appeared in *Surgery, Gynecology and Obstetrics* in 1908—a masterly consideration of the minute anatomy and physiology of the peritoneum, the bacteriology, pathology, symptomatology and treatment of pyogenic peritonitis—is one of the most interesting and most important articles in the surgical literature of the last decade.

About the same time (1907) Murphy published his articles on Surgery of the Spinal Cord, representing a large amount of original observation and study.

Murphy's latest great accomplishments were in the field of bone and joint surgery. His experimental and clinical studies of the processes of bone growth and regeneration, his contributions to the establishment of bone grafting, his original methods of treating pyarthrosis and of reconstituting ankylosed joints (the latter based on embryological data) are the most conspicuous results of these studies, and his "Contribution to the Surgery of Bones, Joints and Tendons," published in serial articles in the *Journal of the American Medical Association* in 1912, is one of the classics of surgical literature. Concerning the still mooted questions of the rôle of the periosteum in bone regeneration Murphy reached some very definitely stated conclusions, and in all the discussions of this subject his views are extensively quoted and largely accepted. Our studies of the growth and disease processes of bones and joints are far indeed from finished; the surgery of the skeletal tissues is equally undeveloped. But where this chapter in surgical history deserves to be written the name of John B. Murphy will occupy a conspicuous place in it.

These are but the most important of Murphy's accomplishments, the outstanding achievements that will carry his name to surgical generations yet unborn. They are, however, but a part of his work, a measure but not the whole measure of his greatness. There is scarcely a field of general surgery in which he did not make important contributions, diagnostic or therapeutic, or in which his technical brilliancy and originality did not shine.

His long career as a teacher has left its impression on thousands who listened to his forceful, logical expositions and observed his unique methods. His clinics were an inspiration, and even in the cold print in which they have recently been reproduced they carry an enthusiasm for accurate observation quite as remarkable as their wealth of observations and of surgical dicta.

So inspiring a teacher, so brilliant a surgeon, could not fail to have a large following in the profession and out of it!

Active in advancing the educational requirements of medicine, Murphy was himself but a high school graduate. He was, however, conspicuously honored by American and European universities, by the profession of this and foreign countries and by the Catholic church.

A mixture of various traits, Murphy's personality was always impressive. His tall figure, his high, shrill voice enunciating surgical teachings in clear, impressive sequence, will be sadly missed in the medical meetings where he had been for so many years conspicuous.

W. M. B.

DISEASES OF THE UMBILICUS.

In *The Medical Gewalt*, a small burlesque medical journal which we have written once a year for the amusement of the Mount Sinai Hospital Alumni of New York at their annual banquet, we wrote in 1913 the following mock book review:

> *Diseases of the Umbilicus.* An experimental and Clinical Study. By Linnaeus Alba, F.R., C.P. (Canadian Pacific), E-M-F, S.C.V., Associate Surgeon to the Asylum for Inebriates and Blind Mutes, Fellow of the Society for Placental Research, etc. In four quarto volumes; profusely illustrated. New York: Abe Domen Pub. Co., 1913.
>
> This exhaustive monograph is a scholarly treatise on the umbilicus, representing many years of investigation. The first volume is largely historical. It traces the development of the umbilicus from its discovery by Adam and Eve on the belly of Cain. The author describes the employment of the umbilicus by birds, reptiles and human savages for the storage of food during the rainy season, and he believes that the secretion of precious stones in the umbilicus of smugglers is atavistic.
>
> Volume II is concerned with the physiology of the umbilicus. It describes the movements of the organ in respiration, copulation and perspiration. Its prenatal function is, of course, described at length. Alba shows clearly that the umbilicus undergoes degeneration in old age. He describes several uses to which it might be put.
>
> Volume III and much of Volume IV deal with the anatomy of the umbilicus. By taking numerous plaster casts Alba has found that the umbilicus varies considerably in size, shape and number of folds. These variations are described in detail and freely illustrated. Alba concludes from these studies that the most constant anatomical feature of the umbilicus is its location in the midline of the abdomen.
>
> There are several erudite chapters on such disorders of the umbilicus as foreign bodies, pruritus, hyperidrosis, ichthyosis, pernio, etc. A short chapter is devoted to the rarer umbilical diseases—eczema, dermoid and hernia. Alba urges early prophylactic excision. There is an appendix on navel hygiene.

Now, three years later, Professor Cullen of Johns Hopkins University publishes a large treatise on this very subject!* We shall press no charges of plagiarism and we shall not further pursue our claims of priority—for we are a modest, peaceful person—but we shall allow nothing (not even the fact that he had published two articles on umbilical affections in 1911 and 1912) to convince us that Cullen did not derive his inspiration from *The Gewalt* and, lest he repeat the offense, we quote here from the editorial page of that peerless publication this warning:

> *Copyrighteousness.* The matter with *The Gewalt* is covered over by copyright, all right. However, no objection will be made to its appearance in other equally disreputable journals if they do us credit.

In *The Gewalt* review we stated that the author "has found that the umbilicus varies considerably in size, shape and number of folds. These variations are described in detail and freely illustrated." Cullen devotes five pages to a description of the appearances of normal umbilicuses, and four pages to drawings by Brödel showing sixty (not fifty-seven) varieties! (These, the navels of patients at Johns Hopkins Hospital, are, it seems to us, much like those to be seen at the Metropolitan Opera House and elsewhere in New York.)

If this argument is not convincing we present another that will silence any doubter. We said in *The Gewalt*: "This exhaustive monograph is a scholarly treatise on the umbilicus, representing many years of investigation." Cullen's work fits this description exactly! It is, indeed, an exhaustive monograph and a scholarly treatise, and it must have required the full three years of investigation for its preparation. It is a richly and handsomely illustrated work, encylcopedic in its completeness, and compiled with a thoroughness of bibliographic study that represents the acme of painstaking and scientific enthusiasm. Its preparation must have cost many thousand dollars, and the profession is deeply indebted to Professor Cullen for supplying it with what will surely remain the classic reference work on the structures of the umbilicus and the urachus, their embryology and their diseases.

None of the rare affections of the umbilicus—such as the escape through it of gall-stones, of round worms, of retroperitoneal fluid, and of fetal remains, and cases even more curious and unique—has been missed in Cullen's searching study of medical literature. How extensive that study was is indicated by an index of names covering ten pages in double column!

There is no part of this remarkable treatise that is not very interesting, but, aside from the value that attaches, for reference purposes, to the case reports of rare conditions, most interesting are the chapters dealing with remnants of the omphalomesenteric duct (umbilical polyp, cyts and fistula, complete persistent duct, intestinal cyst and Meckel's diverticulum), and the chapters on tumors of the umbilicus. Cullen states that dermoids of the umbilicus are rare and that most of the cases so reported were merely umbilical concretions associated with the presence of pus, hair and sebaceous material. He believes that only six of the reported cases were true dermoids. This rather surprises us, for we have seen a few cases in which pus, hairs and cheesy material escaped through what we believed was a skin-lined sinus in the umbilical fold, from a subcutaneous, walled cavity. We regarded these as true dermoid cysts (quite like the sacro-coccygeal) and presumed that they were uncommon but by no means rare.

We have referred to this remarkable treatise outside of our reviewing column because it is a very unusual work, an examplar of bibliographic thoroughness, emphasizing how many interesting facts in medicine attach to what might appear to be a small subject. Besides, we wanted to scold Professor Cullen for spoiling our joke, and we wanted to notify the profession at large that we ourselves are preparing an encyclopedic treatise on the Anatomy and Pathology of the Ligamentum Nuchae, and a somewhat smaller monograph dealing statistically with variations in the Diameter of the Perineal Raphé.—W. M. B.

Surgical Suggestions

Kangaroo tendon is sufficiently strong and sufficently resistent to absorption to be quite acceptable, in most cases, for bone suturing. Wire and metal screws, being non-absorbable, may give trouble later on.

The tampon-canula or "whistle" often inserted in the anus after hemorrhoid operations serves its chief purposes within 24 to 48 hours; and if not removed then it is apt to provoke a disagreeable and persistent edema.

After a hemorrhoid operation the patient can well bear confinement of the bowels for six or seven days (if they were thoroughly emptied beforehand); and healing is encouraged by delaying the first movement that long.

The Umbilicus and Its Diseases. By Thomas Stephen Cullen, Associate Professor of Gynecology in the Johns Hopkins University; Assistant Visiting Gynecologist to the Johns Hopkins Hospital. Large octavo; 680 pages; 269 illustrations. Philadelphia and London: W. B. Saunders Co., 1916.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

EDUCATION FOR SAFETY.

As a vital part of the campaign to reduce accidents, education promises to assume a most prominent place. With the tremendous alteration in educational theories, the importance of industrial and vocational training has come to the fore. There is every reason to stress the value of training potential workers in factories, shops, mines and all other industrial pursuits in the principles underlying accident prevention.

While over 54,000 men and women are accidentally killed in the United States annually and over 2,000,000 are injured in the industries, the nation is guilty of indifference or neglect if no practical steps are taken to prevent this large fatality and disability. The economic loss from accidental injuries amounts approximately to $500,000. Industrial diseases in addition are responsible for an annual income loss—economic wastage--of $772,000,000. The loss from preventable accidents and diseases is greater than the present cost of maintaining all the public schools in the United States.

While the wheels of legislation are slowly moving to secure or enforce proper laws for the prevention of accidents, it is possible for the state to take long steps in advance in installing habits of safety in children and in securing the proper training of the children in our schools, who are the workers of tomorrow.

Recognizing the educational significance and the vast educational content of the "safety first" movement, the University of the State of New York has issued a bulletin on Safety First for Vocational Schools prepared by Louis A. Wilson. Herein are to be found compiled a varied assortment of advice for school boards, vocational teachers, pupils and workers. The application of safeguarding rules for protecting employees in woodworking shops, machine shops, electrical shops are carefully presented. The plumbers, the printers, the painters, the decorators, the pattern-makers, and blacksmiths have presented for their education practical experiences in the trades themselves. The organization of safety controls, safety first sayings for the bulletin board, suggestive lessons in English for foreigners, are provided so as to simplify the work of school teachers and to lay out lines of thought, the traversing of which will lead to better education and a larger measure of protection for the young employees.

For physicians participating in the fields of public education, for members of school boards, for medical inspectors, for factory inspectors, for medico-social workers interested in the problems of accident prevention, indeed for the busy surgeon daily serving the clinic, there is much of importance and value to be found in this bulletin. Familiarity with its contents will be useful to all classes in a community recognizing that cooperation is necessary on the part of the school, the employer, the employee and all other social agencies including physicians and surgeons, in order to reduce to a minimum the preventable and regrettable losses expressed in terms of the killed and injured as well as in the millions of dollars annually wasted.

THE CANCER PROBLEM.

The menace of cancer is not a theory. Frederick L. Hoffman, in his *Mortality of Cancer Throughout the World*, again points out that this disease is increasing in practically all civilized countries. Its mortality throughout the civilized world exceeds 500,000 per annum, and during 1915 there were about 80,000 deaths due to this cause in the United States. The evidence of cancer increase is not invalidated by occasional errors in death certification nor is the statement weakened, after reviewing the discussions, as to whether the increase is merely apparent or actual. The mortality rate from cancer is not due to the increased frequency of any particular type of the disease, nor indeed to an increased degree of localization in any specific organs. Practically all forms of cancer are increasing, though the degree is variable.

Hoffman points out the shortcomings of hospital statistics and urges the importance of standards with a view to facilitating the comparative study of the results of institutional treatment. The entire subject of post-operative results is shrouded in mystery owing to the lack of available data of undoubted trustworthiness. Figures are lacking to cast light on the problems of recurrence, on the average duration of the disease, on the relative degree of malignancy, on the rapidity of growth and on similar phases of the questions which merit consideration in surgical histories.

Surgical experience, at least, has proven with reasonable assuredness that cancer is non-parasitic in origin. The relation of occupations, of chronic irritations, the use of alcohol and tobacco, the part played by so-called pre-cancerous conditions, are still in the category of conditions deserving considerable study in order that further deductions may be made as to the part they play in the etiology of these malignant conditions.

It is patent that cancer control is impracticable until its origin is determined. If there be a relation between gall stones, appendicitis, diabetes, ulcers, syphilis, tuberculosis and cancer, the way in which these conditions predispose to carcinoma is of the utmost importance and any facts related thereto should be ascertained. If they are not precursors of cancer in an etiological sense but are merely chronologically antecedent or coincidental diseases, it is equally important that this fact should be demonstrated. In the meantime, there remains the necessity of encouraging a rational public understanding of existing facts relative to the disease and before all stands out the imperative necessity of acquainting the people of all places and climes with the value and saving qualities of early surgical intervention.

Book Reviews

The Mortality of Cancer Throughout the World. By Frederick L. Hoffman, LL.D., F.S.S., F.A.S.A., Statistician, The Prudential Insurance Company of America; Chairman, Committee on Statistics, American Society for the Control of Cancer, etc., etc. Octavo; 826 pages. Newark, New Jersey, The Prudential Press, 1915.

This is a statistical study of cancer, based upon the mortality records of various municipalities, countries and insurance companies of the world. The records cover every phase of the question. Occupation, sex, race, anatomical and geographical distribution, etc. In addition, general cancer increase is shown to be a proven fact. There is a chapter on the relation of cancer to life insurance, general observations and conclusions upon the cancer problem, tumor classifications and an enormous number of statistical charts. The book is a true mine of information and no one interested in the cancer problem can very well be without it.

Diseases of the Digestive Tract and Their Treatment. By A. Everett Austin, A.M., M.D., Former Professor of Physiological Chemistry at Tufts College, University of Virginia, and University of Texas; Assistant Professor of Clinical Medicine (Dietetics and Gastro-intestinal Diseases), Tufts College, etc., etc. Octavo; 552 pages; 85 illustrations. St. Louis: C. V. Mosby Co., 1916.

This is a large, attractive volume, containing 552 pages of closely printed matter. The radiographs with which it is scantily supplied are by Dr. A. W. George.

The book is a reflection of the private practice of the author. Most of it is given up to his own notions and methods of diagnosis and treatment. Scientific references or the recognition of other men's achievements are so rare as to be practically absent; literary references are entirely omitted, except to the author's own published articles. One hundred and eighty pages are devoted to methods of examination, both laboratory and physical, about ten pages to gastric cancer, two pages to gastro-enterostomy, and half a page to cancer surgery.

The chapter on dietetics is the best written one in the book, and contains considerable information, though little of it new. Newer methods of laboratory diagnosis are altogether absent. We note also, with surprise, the almost complete failure to speak of duodenal ulcer as an entity, that whole field being covered by the term "gastric ulcer," no differentiation being made.

In general, the book serves little purpose from the point of view either of the student or of the practitioner.

Studies in Surgical Pathological Physiology from the Laboratory of Surgical Research, New York University. 1915. Small octavo; illustrated.

A collection of twenty-seven reprinted articles, edited by John Wm. Draper, who is also the largest contributor.

Progress in Surgery

A Résumé of Recent Literature.

Perforated Ulcers of the Stomach and Duodenum. R. P. Sullivan, Brooklyn. *Journal American Medical Association*, July 29, 1916.

Sullivan says that perforating gastric or duodenal ulcer is a most serious condition, with a very grave prognosis unless early recognized and heroically treated. The treatment is purely surgical. We occasionally hear of deaths from acute indigestion, but proper investigation would prove in most of these cases that it was from perforating ulcer. The etiology of perforation is that of ulcer in general, plus its acute termination. He describes the symptoms, which are well known and severe. Vomiting and abdominal rigidity are most significant, and when a patient is met with these and the history of previous indigestion of ulcer type, ulcer should be suspected and looked for and operation is the rational treatment. Between September, 1910, and March, 1916, Sullivan operated in twenty cases of perforated ulcer, with one death; the average duration of symptoms before operation was about six hours. The tabulation of the case is given and fuller details in the text in regard to some of them. Gastro-enterostomy was added to the closure of the perforation in ten cases. "In one it followed pylorectomy, making eleven instances. The factors that were taken into consideration as indication for the operation were: 1. The general condition of the patient would permit it. 2. The duration of symptoms was not over ten hours. 3. The site of the perforation was close to the pylorus, and closuse of it seemed to narrow the lumen to a marked degree. 4. It was assumed that by its performance the period of convalescence would be materially shortened, a factor always worthy of consideration, especially among the class of patients we meet in the wards of our city hospitals. 5. We assumed that if there were multiple ulcers, gastro-enterostomy would diminish the possibility of a second perforation. We never started out with an idea of speed; in fact, our work in each case was deliberate and careful. The average length of time taken to do the gastro-enterostomy was between thirty-five and fifty minutes. In all cases in which this operation was done, we did not encounter any increase in infection. Neither did we have any reason to regret our procedure. The patients all made satisfactory recoveries and enjoyed their semi-solid food with more relish than those on whom we did the simpler operation of suture closure." Sullivan believes that there is a place for gastro-enterostomy, and in the treatment of these cases as to drainage, soft rubber tubes draining through the abdominal wall are his preference. Post-operative care is important; the Fowler position and saline by rectum should be instituted immediately. Where gastro-enterostomy was done water was given by mouth from ten to twelve hours after operating, and forty-six hours later when the stomach was quiet, milk or other fluids in increasing amounts. In cases of simple closure of perforation nothing was given by mouth for from thirty to thirty-six hours, then small quantities of water at frequent intervals of from six to ten hours were allowed, and later, with a quiet stomach, other fluids. In all cases the patients received an enema at the end of thirty hours and then daily for five days. At this time a cathartic, usually castor oil, was given. Soft solids were given the gastro-enterostomy patients on the fifth or sixth day on the average, but to the simple closure patients till the eighth or ninth day. Sullivan sums up his paper as follows. "1. The diagnosis of perforation of a gastric or duodenal ulcer should be made in the majority of cases, and the imperative indication is early operation. 2. In the treatment of cases of duodenal or prepyloric perforations, gastro-enterostomy can safely be added if patients come to operation within ten hours after the onset of symptoms. 3. Simple closure of the perforation without gastro-enterostomy is a safe routine, but later stenosis is more apt to occur. 4. Drainage can be discarded in early cases, especially if operation is performed within six hours after the onset of symptoms. 5. Early use of a liberal diet should be practiced. 6. A complete study of end-results is a necessity before any definite routine can be laid down."

Pseudo-Appendicitis. F. G. Connell, Oshkosh. *Journal American Medical Association*, July 29, 1916.

Connell says that the question of acute appendicitis is settled, at least for the time being. The method and time of treatment and postoperative measures are practically uniform; delay in proper treatment is usually due to uncertainty in diagnosis and the inexcusable estimated general hospital mortality of 10 per cent. is due to the failure of some one to recognize the well accepted principles of surgical diagnosis or treatment. The problem of chronic appendicitis calls for attention, not on account of high mortality rate, but of a more disconcerting morbidity rate —the postoperative persistence of symptoms. When a patient complains of the same symptoms after appendectomy as before operation we may reasonably believe that they were not due to the appendix and that the diagnosis was incorrect. He divides these cases into two classes: those in which the proper diagnoses have been subsequently obtained and those in which the persistence of the symptoms has not been rationally explained, and which might be well called pseudo-appendicitis. Between January, 1909, and January, 1916, he has found eighty-seven records in which the removal of the appendix or the interval operation for appendicitis had not been followed by relief of symptoms; forty-eight of these were operations of his own. During the same time there were 212 patients operated on, all told, for chronic appendicitis. He gives a detailed review of these cases, not as case reports, but analyzed according to the histories and symptoms, the findings and results. In his conclusions, he says that after eliminating all demonstrable pathologic conditions that might possibly be confused with chronic appendicitis, there remains in certain cases some cause for pain and in the right iliac fossa other than the appendix, the exact nature of which is not definitely known. Such cases are frequently associated with visceral ptosis, constipation and neurasthenia. Appendicitis, either acute or chronic or when there has been an unquestioned inflammation, calls for surgery, but pseudo-appendicitis, on the other hand, is an nonsurgical condition, hence the need of a differentiation between these conditions. Every case of so-called chronic appendicitis that is associated with enteroptosis, constipation and symptoms of nervous instability should be looked on as pseudo-appendicitis, until careful and painstaking study of the history and clinical findings prove it otherwise. The advisability of seeing the patient in one of these attacks is pointed out. While an entirely satisfactory explanation of this type has not yet been found, study suggests that a lack of balance between the vagus and sympathetic divisions of the autonomic nervous system may be an etiologic factor, and this in turn may be due to an abnormal function of some of the endocrine glands.

An Unusual Stomach Case, with Roentgenographic Findings. G. E. Brown, Miles City, Mont. *Journal American Medical Association*, June 17, 1916.

Brown describes a case of a patient who suffered from gastric symptoms which were difficult to diagnose and which gave a deceptive roentgenologic picture. Gastric ulcer was the most logical diagnosis, and an exploratory operation revealed on the lesser curvature a small outpouching of the stomach wall about the size of an English walnut, but no ulcer was found. The mucous membrane, however, bled with the gentlest handling. The hernia was plicated with three linen suture and the patient made a rapid and uneventful recovery. The clinical findings were also deceptive, but suggestive of ulcer, namely, hematemesis, occult blood in stools, gastric pain, and vomiting. The gastric diverticulum was very pronounced when the stomach was examined. It admitted the examining finger of the surgeon.

Duodenal Ulcer, Mistaken for Chronic Appendicitis. R. Lewisohn, New York. *Medical Record*, June 17, 1916.

Lewisohn reports four cases upon whom appendicectomy had been performed and in whom subsequent examination and operation revealed a duodenal ulcer. Lewisohn admits that the differential diagnosis is sometimes very difficult, especially when we know that a chronically inflamed appendix may cause pylorospasm, pain in the right hypochondrium, vomiting and sometimes even hematemesis. Before operating upon gastric and duodenal ulcers, Lewisohn is guided by the history, the chemical findings and *x*-ray examination. Two of these factors must be positive. All four cases were relieved by a gastro-enterostomy with pyloric exclusion—two entirely, one almost entirely, and the last developed a gastro-jejunal ulcer.

The Treatment of Non-Tuberculous Bronchiectasis. Howard Lilienthal, New York. *Annals of Surgery*, July, 1916.

In discussing etiology, the post-operative bronchiectasis following tonsillectomy and the removal of adenoids under general anesthesia, especially in adults, is given prominent mention. Eight cases of this sort have been reported by Wessler as coming under his notice within a few months. Indeed, 28 per cent. of all lung suppurations coming to the Radiographic Department of Mt. Sinai Hospital, followed operations of this character.

Diagnosis: As an aid to the customary history and physical examination, the *x*-ray and the bronchoscope have proven of very great value. An expert bronchoscopist (Yankauer) could estimate the character and extent of the infection, recognize the presence of dilated bronchi, and ascertain from which lobe of the lung comes the main amount of discharge. Unsuspected radiotransparent bodies might be discovered and extracted with consequent cure in most cases of recent standing. New growths might be diagnosed by their gross appearance and specimens removed for microscopical examination.

With one of his ingenious devices, Yankauer has been able to wash out such a cavity without flooding the rest of the lung. Relief for several days may follow this procedure, which also may be useful as a pre-operative measure.

Lilienthal sounds a note of warning against diagnostic puncture performed before the actual time of operation.

Indications for surgical treatment are failure to improve under medical treatment and the demonstration (by the *x*-ray and bronchoscope) of a unilateral lesion which is not too far advanced.

Treatment: Palliative operations (drainage of the abscess cavity) are nearly as dangerous as radical (extirpation) and do not afford a permanent cure; besides, they are frequently followed by scoliosis due to the multiple rib resection.

Extirpation, "while surely a capital and dangerous procedure, *does* hold out the hope of actual cure."

Technic: The patient should come to the operating room with his lung as free of secretion as possible. An injection of morphine and atropine is given one hour before operation commences. Before starting the anesthesia, the thighs close to the body are constricted with rubber bandages so as to cut off the venous return and segregate as much blood as possible in the lower extremities. Lilienthal uses the intrapharyngeal method of anesthesia, the narcosis being mostly carried on with nitrous oxid and oxygen, ether being sparingly used

The position of the patient should be with the healthy side downward. For attack upon the lower or middle lobe of the lung, an intercostal incision in the seventh or eighth interspace is made, beginning at the angle of the rib and running forward to the anterior axillary line The pleura is usually opened near the posterior end of the incision and, by inserting the finger, the opening can be quickly enlarged forward without the danger of wounding adherent lung. The rib spreader is now inserted and the ribs forced apart. If more space is needed, it can be gained by dividing the ribs adjacent to the incision at their anterior and posterior ends. Dense adhesions should be divided between ligatures.

"Adhesions between the uninvolved lobe and the chest wall should not be disturbed. Their presence is a safeguard against the collapse of the lung and also against the danger of mediastinal fluttering."

"Inspection will reveal the dusky-red, diseased part in strong contrast to the normal lung and the observation will be confirmed by palpation."

Treatment of pedicle: In these infected cases the structures of the hilum are matted together by inflammatory tissue rendering dissection time-consuming and perilous. Lilienthal therefore crushes the entire pedicle with a powerful clamp and the groove of crushed tissue is secured with a chain of chromicized catgut ligatures. The lung is now cut away beyond the line of crushed tissue and the vessels are separately secured beyond the first ligatures, the bronchial stumps are carbolized and are also once more tied but with no attempt to invert. If there are no adhesions between the remaining lobes of the lung and the chest wall, the stump is fixed by traction sutures to the thoracic wall to prevent mediastinal fluttering. (Draw over of the mediastinum to the well side upon inspiratory effort.) Very little force is necessary to steady the stump and consequently the mediastinum. Great care must be taken to avoid making undue traction upon this suture. In the presence of massive adhesions this stay suture is not necessary.

Lilienthal accepts infection as inevitable and provides for ample drainage. A few chromicized catgut sutures through the muscles approximate the ribs to a certain extent and the skin may be closed with silk leaving a drainage space for the ligature which supports the mediastinum and for the gauze drains.

The dressing consists of gauze padding held in place with adhesive straps which confine the diseased side only, no turns of bandage encircling the body. Respirations are kept down with morphine.

Convalescence is sure to be stormy. The ribs which at first are separated an inch and a half or more, gradually approach each other in from five to ten days. The slough of the stump comes away in time. In three of the cases there was a temporary bronchial fistula which closed spontaneously. Continuous suction may be employed to remove discharges if these are profuse.

Convalescence in the open air has been found of great value.

At the end of his article Lilienthal gives two tables of twelve cases treated by palliative operations: one was cured, five were somewhat improved and six died. Radical extirpation of the lesion showed seven cases, four well and three dead.

Recent Progress in the Operation Treatment of Empyema of the Thorax. HOWARD LILIENTHAL and MARTIN W. WARE, New York. *Medical Record*, July 15, 1916.

The authors believe that the treatment of empyema has been neglected in recent years, as evidenced by the appalling mortality and the frequency (25%) of secondary operations. They hold that these results are due to rule of thumb methods and that the problem centers more in the study of pathology and physiology of empyema than in mere mechanics. Lilienthal and Ware believe that the therapy should consist in two main objects: 1, in relieving intrathoracic pressure that threatens life: 2, in establishing a state which make possible a complete recovery with a minimum of complications and without deformity. As a consequence of their study, the mortality rate in 63 cases done in the past two years is lower than the rate for the previous ten years in the same hospital, and in not a single instance was a secondary operation necessary.

The theory is of immense value: 1, it shows whether the empyema is encapsulated or not and the life of encapsulation; 2, during convalescence the degree of pneumothorax can be observed and areas of consolidation may be determined; 3, in two instances an unsuspected foreign body was found; 4, sometimes the diagnosis of empyema may be shown to be false.

The diagnostic puncture should be made only with the patient on the operating table or just before the operation.

Ether should be avoided as an anesthetic. Either local, regional, nerve blocking anesthesia, or nitrous oxide and oxygen narcosis should be used.

These types of operation are called for: 1. Minor thoracotomy. This consists in simple intercostal incision with insertion of drainage tube. This operation should only be used in bad cases where relief of intrapleural pressure is imperative. 2. Major intercostal thoracotomy with exploration and lung mobilization. This operation, invented by Lilienthal, consists in an extensive resection of rib (4 to 6 inches) with thorough exploration of the thoracic cavity. All pus and coagula are removed. Adhesions are broken down, if not too dense. Intrapulmonary complications, such as abscesses, etc., should be attended to according to indication. This operation is not advised as a primary measure for desperately ill patients. 3. Thoracotomy for encapsulated empyema.

This paper is full of suggestive details and will repay careful perusal.

Bismuth Paste in Chronic Suppurative Sinuses and Empyema; Incorrect Technic as a Cause of Failure in its Application. E. G. BECK, Chicago. *Journal American Medical Association*, July 1, 1916.

Beck has gathered the published statistics of the use of bismuth paste in the cure of suppurative sinuses and abscess cavities within the last ten years, and gives them in tabulated form, with the exception of 319 nose and throat cases, which he excludes from his present consideration. The series of 527 cases from a very wide range of authorities gives an average of 80.64 per cent. of cures, with a minimum of 12.5 and a maximum of 100 per cent. Both the minimal and maximal averages occur with the smallest number of cases and might be considered less significant on that account. To ascertain the lack of uniformity shown, he has observed and conferred with other surgeons in their clinics and come to the conclusion that faulty technic is the chief cause of failure to cure. A suppurating sinus is only a contracted abscess cavity and when the small abscesses lock themselves off they empty in different regions, thus explaining the multiplicity of openings. About 20 per cent. of all cases of diagnosed rectal fistulas are only tuberculous sinuses resulting from spinal, hip joint or intrapelvic abscess, and Beck reports cases illustrating this fact. In using the bismuth method of treatment we have two advantages: It helps to avoid useless operations and gives results without operation. He describes his modus operandi, which consists of injecting a quantity of bismuth paste liquefied by heating in a water bath, and composed of bismuth subnitrate, 30 parts, and yellow petrolatum, 70 parts, into the opening of the sinus until one is reasonably certain that all ramifications are filled. It will rapidly thicken and remain in the sinuses, permitting one to take a roentgenogram. When a sinus is very long and tortuous, the paste should be injected in a liquid state, so that it will flow readily into every part of the tract. If there is more than one opening, the paste is liable to escape from the nearest one and thus miss the remaining channels. To avoid this technical error, the mouths of all the other sinuses should be compressed by an assistant, by placing the finger tips against these openings, so that the liquid will flow in other directions, filling up all channels of the sinuses. It is essential that every crevice should be filled at one injection; otherwise there will be a recurrence of suppuration. An example is given showing how a faulty technic made the physician miss the focus of infection. The common technical errors are insufficient mixing of the bismuth with the petrolatum so as to leave small lumps, insufficient heating, use of improper instruments, injecting with undue force and the most common error is incomplete filling of the complete sinus tract. Too frequent injections and not giving the paste sufficient time to do the work and allowing the patient to dress the wound himself are also causes of failure. Complete directions as to the proper procedure, including the preliminary roentgenization and bacteriologic examinations, are also given.

Abscess of the Lung Following Operation on the Tonsils and Upper Air Tract. Charles W. Richardson, Washington, D. C. The *Laryngoscope*, July, 1916.

Considering the nature of the wound left after a tonsillectomy it is remarkable that secondary infection is as uncommon as it is. The small number of cases of pulmonary abscess reported secondary to tonsillectomy is due to the fact that the condition does not develop until the case has passed out of the hands of the laryngologist. It has remained, says the author, for the internist and the general surgeon to recognize this complication of nose and throat surgery.

The cause is probably embolism or infection of the lung. Aspiration of blood containing cheesy concretions or small pieces of tissue is held to be a cause.

The onset of the disease is characteristic, though often overlooked. There are fever, pain in the chest and cough, with later foul smelling sputum. There are dullness over the affected area, diminished breathing and râles.

Richardson reports three cases that occurred in his practice, all adults. One was operated upon and recovered. The other two made spontaneous recoveries.

The Treatment of Fractures by Methods of Suspension and Extension. J. M. Flint, New Haven. *Annals of Surgery*, June, 1916.

Flint found that the old-fashioned French four-posted iron beds were well adapted for the treatment of almost any injury of the extremity in which either suspension or suspension and extension were required.

Instead of attaching pulleys directly to the iron overhead frame of the bed, a spring was interposed between the pulley and the frame to act as a shock absorber. This was found to add greatly to the patient's comfort. Another trick which made for the patient's comfort consisted in a series of slings (hammocks) in which the splinted limb rested. From both ends of each sling lines led over pulleys to counter-weights which exactly balanced the weight of the suspended limb. This formed a system of automatically adjustable suspension permitting the suspended limb to roll in either direction as the patient turned from side to side.

The method of immobilizing compound fractures, resected elbow or knee, etc., by bridged plaster casts antedates the time of Esmarch and has not undergone much improvement since then. Instead of using bandages to secure the dressings of such wounds Flint has found that small scultetus binders are very convenient and economical. Various modifications of the telegraph wire splint are also depicted in the well illustrated article.

Vertical suspension in fractures of the humerus was found most useful in the early days of treatment, lessening the pain and discomfort at that time.

The mechanical advantages of combined suspension and extension are excellently depicted in the numerous illustrations accompanying Flint's article

The Aperiosteal Stump and Its Care. H. H. M. Lyle, New York. *Annals of Surgery*, June, 1916.

Lyle is a staunch advocate of the Hirsch-Bunge method. Briefly this consists in removal of a small cuff of periosteum (half a centimeter in depth) at the time of amputation. The periosteal cuff should be removed from above downward, the marrow being scraped for a corresponding distance. More than one centimeter should never be removed on account of the possibility of bone necrosis.

As soon as the wound is healed, the medico-mechanical treatment of Hirsch is begun. This consists in massaging the stump twice daily and rubbing in a two per cent. solution of salicylic acid in olive oil. At night the stump is bathed in a warm sodium carbonate solution. The stump is protected with lamb's wool. A box placed at the foot of the bed is so adapted that the patient can press the stump against it for from five to ten minutes three times a day, then four times, and finally every hour. After each treatment the hip and knee are energetically flexed and extended. The standing exercises are then begun. The stump is rested on a bran-bag or a cane-seated chair, placing the weight evenly on both legs and later on all the weight on the stump. At the end of two weeks the patient should be able to wear a peg leg; later on a permanent prosthetic appliance is fitted; this directly receives the weight through the end of the stump.

Lyle states that no stump should be considered good unless it is capable of supporting the whole weight of the body. Moreover, if the stump is not quickly put to use as a real support it may become atrophied and useless. To prevent this, walking on a provisional peg leg should be begun within two or three weeks after the wound has healed and such a peg leg should be fashioned so that the stump takes all the weight on the end. The permanent artificial leg should be built so that the end of the stump supports the full weight of the body.

[*Note*:—Among the French crippled prisoners exchanged through Switzerland and returning to France, it was found that those who had suffered amputation possessed extremely satisfactory weight-bearing stumps which had been treated according to the above-described method.]

Fractures in Children. J. Grossman, New York. *Medical Record*, July 8, 1916.

In treating fractures in children and infants one must always bear in mind the tender skin of the infant, its round agile body; and the movable cover of fat which envelopes the soft bones.

The tendency to heal is much more intense in children than in adults, the time of union is much shorter, and immobilization should be of shorter duration.

A certain percentage of fractures in children do exist with the cardinal signs of fracture lacking, the diagnosis being made in these cases by tracing the point or line of pencil or maximum bone tenderness.

Where following an injury children refuse for any length of time to use a limb, especially if their attention is distracted from the injury, or when they are at play, bear in mind the possibility of a fracture.

One must always bear in mind the necessity of proper retention, as it is just as important as proper reduction in securing favorable results.

Early massage, passive and active movements are very important adjuncts in securing satisfactory results.

Traction Bandage for Reduction of Fracture of the Leg. Howard D. Collins, New York. *Annals of Surgery*, July, 1916.

Collins describes an ingenious arrangement of a single strip of bandage three inches wide and two yards long, which is so applied to the ankle that it forms two Y-shaped hitches, one on each side, symmetrically placed. Traction upon the stem of these two Y's is sufficient to hold the foot in inversion at right angles to the leg. Plaster can then be applied while traction is maintained without any further manipulation. When the cast is completed the entire bandage is covered in except the two projecting Y stems, which can be cut off flush with the cast. As the slings form Y's instead of T's, as soon as traction is relaxed, the constricting effects of the loop immediately ceases. To protect the skin, two pieces of felt, one-quarter inch thick and four inches wide, are applied to the skin before the hitches are made. One piece six inches long is laid across the front of the ankle at the instep and the other, four inches long, over the tendo Achilles. The illustrations show the steps in applying the hitch

The Sliding Graft and the Kangaroo Tendon Suture in Fresh Fractures: Albee Technique.

Walter Lathrop, Hazleton, Pa. *Annals of Surgery*, July, 1916.

Lathrop reports upon a series of two hundred and thirty-two fractures of various bones occurring between October 1, 1914, and December 31, 1915. Of 143 fractures of the extremities 41 were operated upon within ten days after fracture by the above mentioned method. Lathrop states that he would operate according to this method in all compound fractures of the lower leg. He believes that the Albee method offers by far the best means by which good results may be obtained without resort to any foreign body.

Treatment of Unstable Semilunar Cartilages of the Knee Joint.

R. Whitman, New York. *Medical Record*, July 22, 1916.

Whitman holds that the best treatment for recurrent dislocation of the internal semilunar cartilage is removal of the entire cartilage. The fear in which this operation is conventionally held is, according to Whitman, not justified. The operation is very simple, takes but a very short time, and convalescence is rapid. With the leg hanging over the edge of the table, an incision is made midway between the border of the patella and the condyle, its base being just in front of the internal lateral ligament. After opening the joint, the cartilage becomes plainly visible. By extending the incision downward the cartilage may be divided into two parts and is easily removed. Complete layer suture is made and the leg placed in plaster of paris for about two weeks. The knee is then strapped with adhesive plaster to guard against strain, and the patient is instructed to walk. Recovery is usually complete in a few weeks. Whitman reports 10 cases.

Diagnosis of Periosteal Sarcoma With the X-ray.

F. J. Cotton, Boston. *Boston Medical and Surgical Journal*, June 29, 1916.

In a number of cases of periosteal sarcoma, Cotton has noted a peculiar *x*-ray finding which he states in the following proposition: "In case of bone thickening, showing in the *x*-ray plate a picture of slight cortical erosion only, the presence of light stalactite-like threads of bone, perpendicular to the bone surface, strongly suggests sarcoma." Cotton has seen a more or less similar picture at *one* or *two points* in an obvious case of bone syphilis, but at all events he believes that the stalactite formation, while not absolutely pathognomonic, is nevertheless a very important diagnostic sign.

Traumatic Pulsating Exophthalmos.

W. Zentmayer, Philadelphia, *Journal of the American Medical Association*, July 15, 1916.

Zentmayer says that, though comparatively rare, pulsating exophthalmos is of so serious and distressing a nature that the report of any operation performed for relief must be of interest. In view of the successful results of operations on the superior ophthalmic vein, de Schweinitz and Holloway are of the opinion that this operation should be considered before ligation of the carotid and certainly should precede ligation of the second carotid in case the first operation failed. A review of the later literature, however, shows that for the alleviation of the symptoms of the traumatic type at least the earlier operation of the ligation of the carotids is still usually performed. In the majority of cases there is little doubt that the lesion is a rupture of the internal carotid in the cavernous sinus and that the dilatation of the ophthalmic veins and the nasofrontal and angular veins is the result of the venous stasis thus created. It seems logical therefore to try to prevent the stasis rather than to remove the end-result, hence the preference for operations on the carotid. Another reason is that temporary unfavorable symptoms developed in three of the seven cases collected by de Schweinitz and Holloway, and that there has since been one fatal result, or they have foreseen the danger of thrombosis of the basal sinuses, a possibility emphasized by the above authors. Still another reason against the performance of the orbital operation has doubtless been that, owing to the gravity of the condition, the general surgeon has been called on with his greater familiarity of operations in the neck triangle. Zentmayer reports his case in full, together with notes of another case reported by Dr. Frederick Krauss as illustrating the dangers of the orbital operation. In his own case the carotids were operated on. The patient is still in the hospital suffering from nephritis. He also reviews the recent literature of the subject since the articles of de Schweinitz and of Bedell in 1914. His summary and conclusions includes the twenty-nine cases reviewed, and shows that there were sixteen carotid operations resulting in cure in seven, improvement in five and failure in four. Combined ligation of the carotids and ophthalmic vein was performed once, resulting in cure. Combined ligation of the internal carotid and the facial vein was done once with cure. Ligation of the orbital veins was done once, causing slight improvement. Slow ligation of the carotid was done twice, resulting in one cure and one slight improvement. Ligation of both carotids was done once with failure. Compression of the carotid and internal treatment resulted in two cures, improvement in one case and unknown result in one. Gelatin injections were used in one case with cure and there was no treatment in six cases. Combining these cases with those analyzed in Bedell's paper shows that the common carotid artery was tied thirty-two times with cure in twelve, improvement in twelve and failure in eight. The orbital operation was done in six cases, with three cures, one improvement and two failures. Gelatin injections were used in four cases with cure in two and improvement in one and failure in one. In this combined series there are thirty-two cases of ligation of the common carotid without a fatality. If late cerebral softening can be prevented by slow ligation, as is claimed, the order of surgical procedure should be slow ligation of the carotid followed by ligation of the ophthalmic vein in those cases in which the primary operation fails to cure. Apparently there can be no objections to the gelatin injection treatment being used if the patient is seen early.

The Technique of Suprapubic Cystotomy in Badly Infected Cases.

Hadley Williams, London, Canada. *Annals of Surgery*, June, 1916.

Williams dissect down to the bladder wall proper, passes two traction sutures through the muscular coat on each side close to the median line and then packs the wound from four to seven days before actually opening the bladder. This allows the formation of granulations which prevent any contamination of the paravesical cellular tissue. Thus, according to Williams' method, for vesical calculus a two-stage operation is done, and for a prostatectomy, a three-stage operation is performed.

The Danger of Iodine Solutions for Sterilizing the Skin in Abdominal Operations.

A. E. Wayland, Glasgow. *British Medical Journal*, July 15, 1916.

Wayland has discarded the use of iodine solutions to sterilize the skin in abdominal operations because he fears that even a small amount of iodine may cause adhesions. This fear is based upon the experimental proof that iodine even in dilute solutions very easily causes adhesions. (Bertelsmann, Walker and Ferguson.)

Paralysis of the Intestine After Resection for Gunshot Injuries.

O. Richards and J. Fraser, *British Medical Journal*, July 1, 1916.

The authors report three cases. In all resection of a wounded fraction of small intestine was followed by obstruction, the segments of intestine above the union becoming distended, while the segment below was contracted. They believe the cause is a nervous one, arising from the injury itself and the resultant shock, and increased, perhaps, by the local peritonitis. A case in which this complication is noted may be saved by subsequent short-circuiting of the affected coil. This was attempted in two patients, one of whom recovered.

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OPERATING UPON THE POSTERIOR FACE OF THE STOMACH BY THE INTER-COLO-EPIPLOIC ROUTE.

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Lardennois and Okinczyc some three years ago demonstrated the feasibility and advisability of exposing the posterior face of the stomach for total colectomy, and my esteemed friend and colleague, Professor V. Pauchet, finding that by their procedure, hereinafter described, he could largely expose not only the posterior face of the stomach, but also the duodenum and pancreas, has practically adopted it for all gastric operations, and especially for the repair of gun-shot wounds.

The procedure recommends itself by absence of hemorrhage and ease of accomplishment, and I believe it will meet the general approval of those surgeons who become acquainted with its technic.

Since the beginning of the present war the discussion has not ceased as to the advisability of surgical intervention in wounds of the abdomen, and I am one of those who has fixed, as the requisites for such intervention, five essentials: a good operator, aided by a good assistant, with good and proper surgical materials and appliances, in a good, safe location and surroundings, and unhurried time in which to operate. Lacking these elements, abstain from operative intervention.

For perforating wounds of the stomach, where it is necessary to reach the posterior face, the operator has the choice of four routes.

1. *By the gastro-hepatic route.*—The lesser omentum is pierced by the index finger at the border of the curvature permitting the finger to explore the posterior gastric aspect: a narrow and blind procedure.

2. *By the transmesocolic route.*—The ordinary choice where the surgeon desires to perform a posterior gastro-enterostomy.

At a level of one of the vascular arcades of the mesocolon an opening is made, affording access to the posterior face of the stomach. This route is easy but circumscribed.

3. *The colo-gastric route.*—This consists in cutting the colo-gastric ligament at the border of the greater curvature and separating the transverse colon from the stomach. The stomach is lifted up, freed from the great omentum, which remains adherent to the transverse colon, which is pushed down with its mesentery.

This maneuver gives an open field, but is more or less slow, as it requires a number of ligatures.

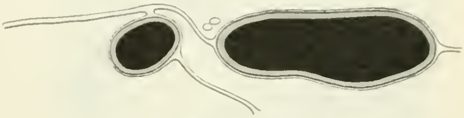

Fig. I. A vertical and sagittal cut, showing the stomach, transverse colon, the mesocolon and great omentum, which is loosely adherent and without blood-vessels at its insertion to the transverse colon.

4. *The new method of Lardennois, Okinczyc and Pauchet*, to the description of which this paper is now devoted, is incomparably superior to the others, being easy, rapid and benign: it has been named epiplo-enterocolic and consists of separating the greater omentum with its mesentery, from the transverse colon.

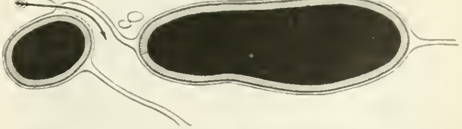

Fig. I-A. Shows the manner of lifting the great omentum and the point at which it should be separated from the transverse colon, without hemorrhage.

By reference to the schematic figures I, I-A, and II, representing the greater omentum, stomach and transverse colon, with its mesentery, the reader will see how the posterior aspect of the stomach is exposed in its entirety, with free access to the epiploic cavity.

The technic of the procedure is simple, but requires care in manipulation.

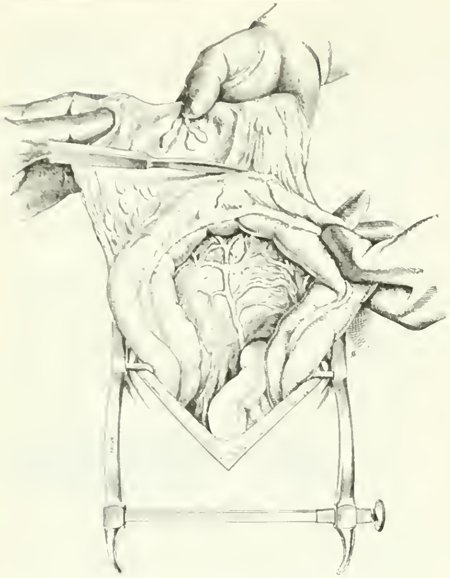

Fig. II. The abdomen is opened and held so by the retractors of Gosset, the epiploic insertion into the transverse colon is being separated by the point of the bistoury.

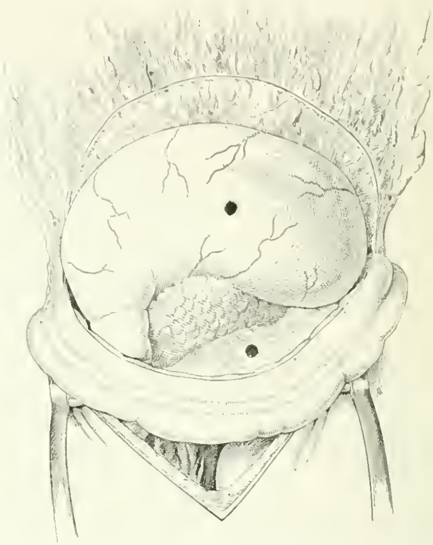

Fig. IV. The great omentum completely separated from the transverse colon, is lifted up with the stomach, when a wound of the posterior face can be easily repaired. The pancreas is shown between the stomach and transverse colon. The duodenum is brought into view at the pyloris end.

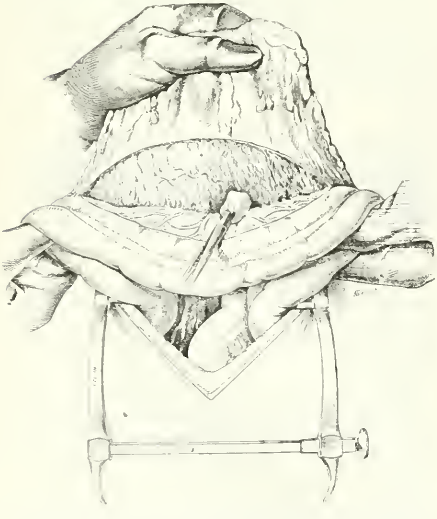

Fig. III. The intercolo-epiploic incision once started by the bistoury is continued by aid of a tampon of gauze mounted upon the forceps, along the black line. When the great omentum is completely separated from the transverse colon, it is lifted up, and with it the stomach.

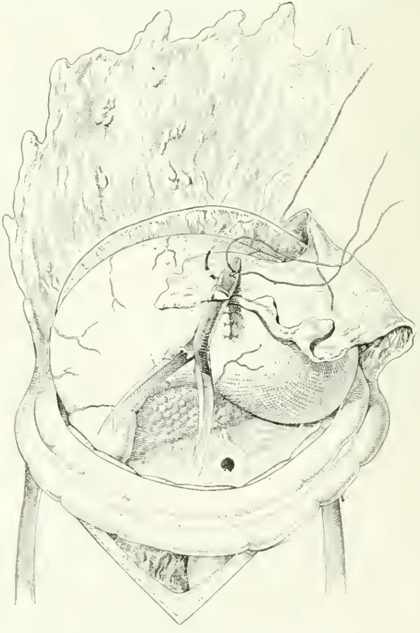

Fig. V. Shows the reinforcement of the repaired gunshot wound, by a fold of the omentum. The remainder of the great omentum is pushed into the posterior epiploic cavity. The transverse colon is sutured directly to the great curvature of the stomach at the line of insertion of the great omentum.

After opening the abdominal cavity, with the point of the bistoury, scratch an opening in the serous membrane of the transverse colon at its juncture with the greater omentum, then with a tampon of gauze mounted upon a forceps, gradually separate the one from the other (fig. III) the full length of the insertion; this should be done without tearing and will prove to be free from all hemorrhage. By lifting up the apron of the omentum thus freed, the posterior face of the stomach comes into full view, as well as the pancreas and duodenum, as the transverse meso-colon with its vascular arcades is pushed downward.

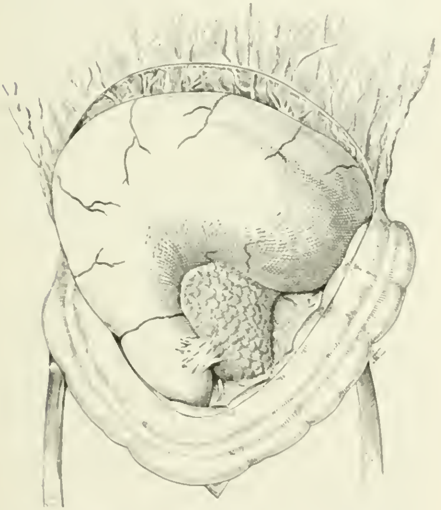

Fig. VI. Shows an ulcer of the duodenum, adherent to the pancreas, not recognized in an exploration of the anterior surface of the stomach, made perfectly visible after the intercolo-epiploic separation.

The operator who avails himself once of this route will frequently practice it in a variety of conditions.

1. *Exploration of the stomach and duodenum.*—Professor Pauchet, in a recent communication,* said: "Formerly when I operated upon a subject supposed to be suffering some gastric trouble, I opened the abdomen, examined the pylorus and anterior aspect of the small curvature of the stomach, and if my fingers and eyes found nothing, I concluded there was an error of diagnosis, and I missed the real trouble."

"Since I have practiced the intero-colo-epiploic separation, it frequently occurs that I find by exploring the posterior face of the stomach, an ulcer there or of the duodenum, which might otherwise have remained hidden." (fig. VI.)

2. *For gun-shot wounds.*—The wound of the anterior face of the stomach is found and sutured: then the operator opens into the posterior cavity by the intero-colo-epiploic separation, finds and fixes the posterior wound by a Volsellum forceps, or by two sustaining threads, in order to close the opening by four separated sutures, after which the free border of the omentum is sutured to reinforce the repair. (figs. IV, V.)

The posterior epiploic cavity is carefully swabbed out with a tampon, wet with warm saline solution or ether; the greater omentum is then introduced into this cavity in its entirety and the inferior border of the stomach is sutured to the transverse colon at the line of its separation from the epiploic insertion. The greater omentum thus abandoned in the posterior cavity acts in phagacytosis and replaces drainage.

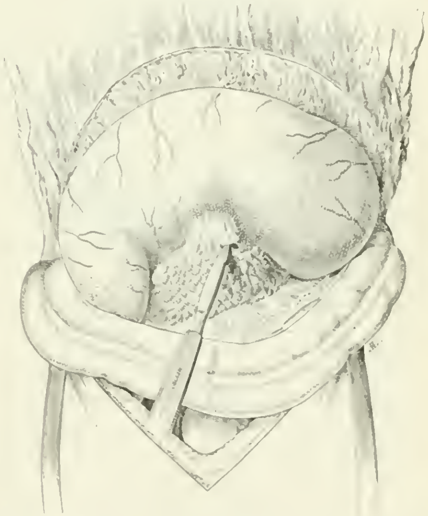

Fig. VII. Shows the facility with which an ulcer of the smaller curvature can be separated from its adherence to the pancreas. After its liberation, the ulcer can be resected, or a partial gastrectomy can be performed.

3. *Ulcers of the lesser curvature and posterior face of the stomach.*—Gastric ulcers repair best if they are resected. Resection is easy if the ulcer is located at the level of the pylorus. They are more delicate and difficult if they occur upon the lesser curvature or posterior gastric face, and especially so if found high up near the cardiac opening.

By this new route, it is comparatively easy to find the hidden ulcer, and it is a boon to the surgeon when inflammatory adhesions must be separated. The ulcer once liberated can be resected, but if the surrounding surfaces are much inflamed, it is better to perform a partial gastrectomy, which will be found to be less grave and more efficacious.

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* Bulletins et memoires de la Société de Chirurgie de Paris, May 10, 1916.

4. *Dissection for cancer of the pylorus.*—The diagnosis once made and the surgeon once in the midst of an operation for this condition, should not substitute a gastro-enterostomy for a radical operation, except he finds a metastasis of the peritoneum, or in the lumbar glands. Some operators decide upon a gastro-enterostomy when they find the tumor adherent to the pancreas: (fig. VII.) as this condition is almost constantly inflammatory, this substitution is to be regretted.

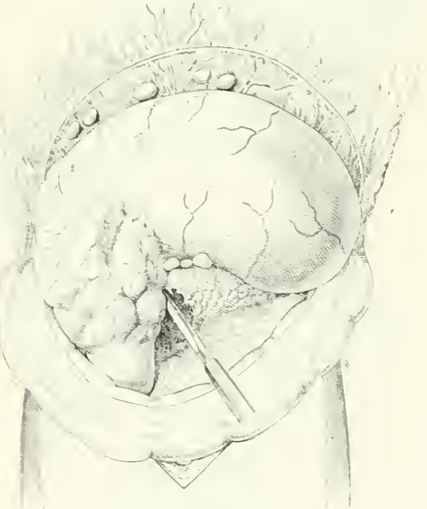
Fig. VIII. Shows the separation of a cancer of the pylorus from the pancreas and transverse meso-colon. The enlarged glands are shown. This drawing was made from an actual case.

By systematically practicing the intercolo-epiploic separation in the presence of cancer of the pylorus, the surgeon arrives directly upon the tumor and can separate it from its adhesions with a facility equal to an organ superficially located in the abdomen. If pancreatic adhesions exist, they cannot only be separated under the eye, but the colica media artery can be more readily recognized and protected. (fig. VIII.)

By this route, the liberation of the stomach and the tumor, constituting the first period of the operation, is greatly facilitated, and the stomach, freed from its colic and mesocolic attachments, can be freely lifted, affording an open field in which to proceed with the succeeding steps of the operation.

5. *Operations upon the pancreas.*—By this route the pancreas is laid open to its full length. I saw Professor Pauchet operate upon a patient in the service of Dr. Walther in La Pitié Hospital, where the diagnosis of a tumor of the pancreas had been made by the Chef de Clinique and Professor Arrou.

By a double paravertebral injection of novacain-epinephrin, Corbière, producing complete anesthesia of the epigastrium and the visceral contents, he was enabled to perform a laparotomy without the aid of ether or chloroform, and with complete absence of pain to the patient.

After making the colo-epiploic separation, the pancreas was exposed full length, permitting a full examination, which revealed an inoperable condition.

A trial of this new route will serve to persuade the operator that it marks a distinct advance in abdominal surgery.

GASTRIC AND DUODENAL ULCER: WITH ESPECIAL REFERENCE TO ETIOLOGY AND DIAGNOSIS.

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Diagnosis of any pathological condition, and particularly of the gastro-intestinal tract, cannot be intelligently discussed without due consideration of its etiology. The close proximity of the pancreatic ducts, the biliary ducts, the pylorus and the duodenum, not only predispose these tissues to frequent infection and trauma, but leave us without a *single* symptom that is pathognomonic of disease of any one.

Lesions of the stomach and duodenum do *not* consist of the large number of ulcers that we have been led to believe the past few years. In this section of the country especially, ulcers of the stomach and duodenum form a comparatively small percentage of the digestive disturbances we encounter, in contradistinction to the teachings and writings of many capable men the past five years. Where ulcer *does* exist, and I say it without reservation, it is *not a disease* but a symptom. A symptom of what, one may ask? I would say a symptom of any condition that will produce pyloric obstruction, organically or spasmodically, and this condition may be present in the pancreas, in the appendix, in the colon, the prostate, the teeth, gums, nasal sinuses, in the blood stream itself, and last and probably of greatest frequency, in the liver and its adnexa. Experimental ulcer has been recently produced in the following ways:[1]

(1) By section of the spinal cord, and after that, introducing strong HCl. into the stomach (Koch and Ewald);

(2) By trauma and thermic irritation (Ritter and Decker);

(3) By producing hemaglobinuria (Silberman);

(4) By bleeding animals to severe anemia (Quincke);

(5) By injecting an emulsion of wax particles into central portion of the femoral artery (Pannum);

(6) By injecting a suspension of chromate of lead into the splenic or gastric interior (O. Cohnheim).

These are all proofs of ulcer formation in animals, but undoubtedly in man many superficial ulcerations occur which do not develop into typical ulcers, as demonstrated by the hemorrhagic areas in alcoholics, and in acrobats who introduce sharp bodies into their stomachs producing follicular swelling but no ulcerations.

It would seem, therefore, that factors outside the stomach and of constitutional origin must be causative, in some instances at least, in the production of ulcer. In proof of this we have the following experimental work to support us:[1]

(1) Demonstration of bacteria in colonies on the floor of the ulcer (Boetcher and Latulae);

(2) Production of ulcer by injecting colon bacilli (Turck);

(3) Production of ulcer by cutting the vagus below the diaphragm (Von Yzeran);

(4) Production of ulcer by ligating the left branch of the portal vein—due to disfunction of the liver. Of course, in addition local atrophy of the liver occurred. From this it was concluded that normally there are toxic substances formed which are rendered non-poisonous by the normal functionating liver. If the liver cells are diseased this disintoxication cannot be accomplished. The fact that through injection of liver extract ulcus ventriculi or intestinal bleeding may be produced, is proof of the toxic influence of the dead liver cells (Gunderman). Many attribute ulcer to disease outside of the stomach (chronic appendicitis, gall bladder disease, chronic obstipation), which by way of visceral nerves causes contractions of the musculature of the stomach, thus leading to ischemia and ulcer formation, and also hemorrhages of small vessels.

While there remains a difference of opinion as to how ulcer is produced, in the main all agree that in order to have ulcer produced occlusion of the local blood supply with ischemia is necessary. That this condition may be brought about in a number of ways, a great variety of experimental work has proven. That this occlusion is a result of spastic contractions of the pylorus in many instance is proven by *x*-ray demonstration of pylorospasm, etc., and in an experimental way by Hamburger[2] in his recent work in constricting the pylorus to various degrees of obstruction. The question of auto-digestion after the lesion is once produced has been widely debated. It is known, however, that in addition to the pancreas, the stomach contains an active proteolytic enzyme which unrestrained is capable of destroying tissue where there is an impaired vitality of the mucosa. Whether or not the liver may also contain such an enzyme I have not heard discussed. The work of Gunderman, however, and the fact that by injecting liver extract ulcer can be produced, would account for many conditions that have heretofore gone unexplained. I refer particularly to those cases of gastric hemorrhage without further evidence of ulcer. We have had a few of these cases come to operation, and the only lesion shown was adhesions about the pylorus and duodenum, sufficient, however, to allow more or less backward flow of bile into the stomach under various conditions; and if, as seems possible, there is a proteolytic enzyme present, hemorrhage would follow. With a tendency to chronicity, ulcer would naturally ensue. I have three such cases under observation now, with not one symptom of digestive disturbance, but each patient has had severe hemorrhages coming on suddenly without warning, and without symptoms of gastric disturbance following.

The foregoing is presented to show the possible cause of ulcer, and to prove that there *is* a pre-ulcer stage which in a majority of instances is medical, and that prophylaxis is of the very greatest importance in preventing ulcer formation. Comfortable existence in America (from the standpoint of finance) means hasty eating, overeating without consideration for quality, insufficient rest after meals, relaxation, both mental and physical, neglect of daily evacuation of the intestinal tract, etc. This in turn means hyperacidity, hypersecretion, weakening of the stomach muscles, and eventually ulcer through the process before mentioned. Once, however, ulcer is formed its presence should be determined early, and to do this it is necessary to avail ourselves of all the various diagnostic methods, and even then a large number of errors will result.

It was my privilege to study a series of 420 cases of ulcer of the stomach and duodenum prior to 1915. Many cases have since been studied and followed through operation, but the statistics of later cases have not been compiled. Of the 420 cases in this series, there are certainly many diagnostic errors. However, those errors occurring after using all the various diagnostic methods are in a degree excusable.

In the study incident to the compilation of these statistics, I have been firmly convinced that an appreciation of the etiology and a proper interpretation of symptoms obtained, not from *one* method of diagnosis, but from *all*, is necessary before an intelligent line of treatment can be prescribed, either medically or surgically. That all ulcers of the stomach and duodenum do become surgical if not properly treated can admit of no doubt. That all ulcers which have become surgical have gone through a stage in which careful hygienic and dietetic measures would have effected a cure, thus obviating surgery, has equally impressed me. This being the case, there is a medical stage of ulcer which is extremely difficult of diagnosis, and is usually treated simply as "dyspepsia" or indigestion. On the other hand is the surgical stage in which the symptoms have persisted until the typical ulcer has developed, and medical measures are worse than useless because they do not cure, and the patient through a mistaken idea of temporary relief for permanent cure at least suffers one of the several sequelæ, the most frequent and serious of which is carcinoma. I would, therefore, urge earlier diagnosis of this condition, which, in a large percentage of cases, can be done with the necessary laboratory and *x*-ray aids.

Of the 425 cases here reported 277 were males and 148 females. The following table shows that more people were affected between the ages of thirty-five and fifty, but on account of the frequently long duration of ulcer I doubt the value of such statistics, since many patients above forty have had symptoms from ten to twenty years and just as properly belong to another period.

TABLE NO. 1.

Age: 10 to 20	8	1.8%
20 to 35	127	30%
35 to 50	208	49%
50 to 60	51	12%
Over 60	31	7.3%

Of this number 306 (72%) had lost weight (up to 50 lbs.), 107 (25%) had remained stationary, and in 12 (2.9%) there was a gain of weight; 269 (63.3%) appeared healthy, and 156 (36.7%) were sickly.

In support of the theory that infections play a part in the production of ulcer, table No. 2 will be found interesting:

TABLE NO. 2.

	No. of cases.	Occurrence of digestive disturbance.
Rheumatism	24 or 8%	Within two weeks
Throat infections	11 or 2.6%	"
Grippe	11 or 2.6%	"
Diarrhea	5 or 1.1%	"
Appendicitis	7 or 1.6%	"
Neuritis	2 or 0.5%	"
Puerperal fever	11 or 2.6%	"
Acute Nephritis	5 or 1.1%	"
Ptomaine poisoning	9 or 2.1%	"
Tenia	3 or 0.7%	Associated with
Diphtheria, yellow fever, septicemia, pancreatitis, gonorrhea, colitis, peritonitis, parotitis, cystitis, chorea, abscess (one each)	11	Immediately
Typhoid fever	22 or 5.2%	Two weeks to 30 years
Malaria	8 or 1.9%	Indefinite
Heart lesions	12 or 2.8%	"
Syphilis	9 or 2.1%	"
Pneumonia	5 or 1.1%	Immediately to 4 years
Tuberculosis	5 or 1.1%	Indefinite
Total	170 or 40%	Infections
Alcoholic	20	Immediately
Injury	8	"
Over-exertion	3	"
Operation (other conditions)	10	"
Nervous shock	3	
Foreign body, drugs, angina, diabetes (one each)	4	

As far as I was able to determine, the other cases started in with some digestive disturbance for which the patient could not account other than, in a majority of instances, by a heavy, indigestible meal. It seems quite reasonable where indigestion was the primary symptom, that a simple abrasion from dietary indiscretion was the beginning, and a subsequent infection was responsible for the ulcer. The metastatic infections from the streptococci occur within twenty-four to thirty-six hours, would indicate that those cases following throat infections, rheumatism, grippe, etc., were metastatic manifestations. Metastases from typhoid fever, pneumonia, tuberculosis, syphilis, etc., are very indefinite, and such is the case in this series. In connection with the valuable experimental work that has been done, to me the figures are at least significant. It might be interesting to note at this time that of the 425 cases, constipation was present 277 times (65+ %), and diarrhea but five times, a little more than 1%. Whether this is cause or result I am unable to say, but I believe it to be an etiological factor. In this series, as has often been pointed out by other observers, the most frequent time of occurrence is in the spring and fall. That organic lesions are rare in the asthenic habitus is evident from the fact that in the 425 cases the enteroptotic habitus was present in only 80 and the normal in 345 or over 81%. Indeed, I am of the opinion that what errors in diagnosis exist in this series would be found in the 80 cases of ptosis, in which the manifold symptoms of this condition are often quite similar to those of ulcer.

To my mind, one of the most forceful arguments against snapshot diagnoses is the number of cases operated upon yearly for other conditions, and after which the symptoms persist. That a competent surgeon would not leave any pathologic condition in the abdomen is true, but the following table would indicate that all surgery is not competent:

TABLE NO. 3.

Operation.	Number	Results.
Appendicitis	12	No relief
Gall bladder drainage	6	"
Ovariotomy	3	"
Curettage	3	"
Gastro-enterostomy	1	"
Gastro-enterostomy	1	Partial relief
Perineorrhaphy	2	No relief
Duodenal ulcer	1	Partial relief
Hemorrhoids	3	No relief
Fixation of abdominal organs	1	"
Total	33 or more than 7.5%	

A complete examination of these 33 cases left no reasonable doubt as to the probability of ulcer.

While the anamnesis is of the greatest importance in diagnosis, the foregoing table would indicate that it is not sufficient and the physician or surgeon who depends upon this alone is likely to fall into many errors. That diseases of the gall bladder, pancreas, appendix, etc., produce symptoms similar to those of gastric and duodenal ulcer we all know, and the anamnesis should do no more than in a general way to locate a pathological condition in the abdominal cavity. Just which organ is affected must be determined by other and more accurate diagnostic methods. It is the most important spoke in the diagnostic wheel, because if properly secured it tells us of the presence of trouble, but it does not locate it. In my series an attempt has been made to classify pain as far as possible. Distension from gas is classified separately and is the most constant of all symptoms, as it is also in gall bladder lesions:

Distension and pressure symptoms	368 or 86.6%
Pain not classified	78
Gnawing	28
Burning	125
Cramping	20
Sourness	91

This makes a total of 251 cases, or 59%, that actually complained of pain. In 353, or 83%, belching was a constant symptom.

Symptoms occurring more than two hours after eating	195 or 46%
Symptoms occurring less than two hours after eating	147 or 34.6%
Symptoms occurring irregularly	49 or 11.5%
Symptoms occurring during the night also	70 or 16.5%
Relieved by eating in	208 or 49%
Aggravated by eating in	157 or 37%
Eating bore no relation in	60 or 14%

If the time of occurrence of symptoms after eating is an index to the location of the lesion, then we have in 195, or 46%, a probability of duodenal ulcer, and in 147, or 34%, a probability of gastric ulcer. While a fairly reliable index, it is by no means constant, and not comparable to other means for location of the lesion. Clinical observation proves that the time of pain depends upon a number of factors, size of the ulcer, quality and quantity of food, and whether one or the other ostium of the stomach is sympathetically involved in aggravating the pain. After a light meal, independent of the site of ulcer, pain occurs one or two hours later, and after a heavier meal three or four hours later.[1]

Just what significance food relief and food aggravation may have, I am unable to say. The general impression has been that by combining the free hydrochloric acid we thus remove the irritation, and the pain or distress is relieved. I have seen several cases which suffered pain, burning, etc., two or more hours after meals, and were promptly relieved by an alkaline powder, a cracker, or even water. There was occult blood in the stools, and all the roentgenograms showed distinct evidence of ulcer; yet the gastric analysis showed a total absence of free hydrochloric acid and the combined acid running about 10.

That pain is due to tugging on the parietal peritoneum, the result of peristaltic contraction to rid the stomach or duodenum of a lesion, is to my mind the most logical conclusion. The cervix of the uterus, the cervix of the gall bladder (or cystic duct), the cervix of the urinary bladder, etc., are all alike in this respect. A lesion at this point produces hypersecretion, painful contractures and tenesmus which are not present in other portions of the organ. In my experience ulcers of the greater curvature have not been accompanied by much pain, even when perforation has taken place, as has been demonstrated in two cases by surgery. Food relief is obtained for the same reason that vomiting is comparatively easy and painless, when there is plenty of contents to be evacuated. When this is accomplished, however, and the violent wrenching persists, the process becomes painful and annoying. Of much greater importance than the time pain appears is the presence of localized tenderness. In this series it was present in 344 cases, or 81%. While it is true that lesions of the pancreas, gall bladder, and appendages will give painful areas, their constant presence mean a pathological condition, and other methods must be employed to eliminate the unoffending organs.

Laboratory Methods: The chief value of gastric analysis is to afford an intelligent idea of proper dietetic treatment. As a diagnostic aid it is probably of some subsidiary importance, but in comparing analysis in 220 cases with a similar number of analyses for other conditions, there is hardly sufficient difference to use this as a strong diagnostic guide. The total contents of the stomach (method of Mathieu) is probably of some significance in determining obstruction, but not as reliable as the raisin-meal or a residue six hours or more after the bismuth-buttermilk-meal. Occult blood in the gastric contents is valueless unless the tube is passed with great care and there has been little or no retching or gagging by the patient.

Appearances	Acidities:	Combined HCl.:
Bile stain 11=5%	Normal 43=1.5%	Above 10
Mucous 102=46%	Hyperchlorhydria 136=62%	146=66.4%
Vis. blood 19=8.6%	Subacid 25=11.4%	Below 10
Normal 93=42%	Achylia 16=7.2%	74=33.6%
Hyperchlorhydria	Free HCl above 50	
Occult Blood: 155=70.5%		Lactic Acid: 58=26.3%

Fecal analysis: The presence of occult blood in the feces is of great diagnostic importance, provided care be taken to eliminate those things from the diet known to cause a positive reaction. It should be remembered also that ulcers do not bleed continuously, and repeated tests should be made from day to day. Small bleeding hemorrhoids should, of course, be considered. In 77 examinations made, occult blood was found in 43, or 56%. This is not a fair estimate, however, since in many instances we do not have our patients under observation long enough to determine this point. Three tests are always used, the benzidin, guaiac, and aloin, the benzidin being much more delicate.

The urine was analyzed in all of the 425 cases. It is frequently valuable in making a differential diagnosis, but there is nothing to point to disease of the stomach or intestines notwithstanding all that has been said and written concerning indicanuria. The constant presence of bile in the urine is of course in favor of disturbed liver function. The Cammidge reaction has been the cause of our diagnosing a pancreatic lesion in several instances where without it we should have diagnosed ulcer. The trypsin test of both the stomach contents and feces after oil, is also a valuable aid to the diagnosis of pancreatic lesions.

Blood analysis: Friedman[3] claims that in duodenal ulcer polycythemia is frequent, and anemia rare; and the reverse true in gastric ulcer. A study of the blood in 77 cases does not conform with this, in fact there is nothing of value other than possibly a leucocytosis such as one would get from an active lesion located in the cervix of any organ where the blood supply, lymphatics, etc., are richest. I do believe, however, that a leucocytosis is an aid in localizing the lesion at the cervix of the organ. Just why the blood picture should vary here from similar lesions elsewhere, I am unable to see from a histological standpoint. The average hemoglobin in this series was 72.2%, and the average R. B. C. 4,600,650.

Friedman states a fact that he has noted in his observations without attempting to explain the reasons therefor. In support of my theory that the liver is responsible in many instances (if not all) for the production of ulcer of the duodenum, I should like to refer to the excellent scientific research work done by Paul D. Lamson[4] in the Pharmacological Laboratory of the Johns Hopkins University, of Baltimore, and reported in the *Journal of Pharmacology and Experimental Therapeutics* under the head of "The Rôle of the Liver in Acute Polycythemia." He shows that by injection of epinephrin in proportion of .9 mg. per kilo, that polycythemia is produced. Experiments were made to ascertain the part played by various organs in the production of polycythemia. This was done by removal of the organs where possible, and in other instances by "cutting off" the organ from the general circulation. The intestine, its mesentery and the omentum, the spleen, the pancreas, bone marrow, muscles, lungs, kidneys and skin were shown to have no control whatever over the production of polycythemia; when, however, the liver was "cut off" from the circulation, the polycythemia was immediately stopped or prevented after injection of epinephrin. The following is his summary verbatim:

(1) The red corpuscle content of the blood is a constantly varying quantity under physiological conditions;

(2) Certain new means have been found by which the red count may be rapidly and greatly increased;

(a) Lung emboli produced by the injection of corpuscles hardened with formaldehyde, or an inert powder, as lycopodium, or of oil;

(b) Emotional stimuli, as fright and rage;

(3) The polycythemia produced by the injection of epinephrin is due to the action of the liver alone;

(4) Ligature of the arterial blood supply to the liver excludes the production of polycythemia after the injection of epinephrin;

(5) Later release of this ligature allows the customary increase in number of red cells to take place without the further injection of epinephrin;

(6) The liver effects this increase in number of red cells by:

(a) A decrease in plasma volume, not sufficient to account for the entire increase in the number of red cells, however;

(b) By bringing into the circulation red cells which were not present before the production of polycythemia as shown by (1) their reduced size; (2) their reduced percentage hemoglobin content;

(7) These cells give none of the usual reaction of young cells. There is an absence of nucleated red cells, no change in the fragility of the corpuscles, and no increased metabolism of the red cells themselves, as shown by an increased rate of reduction;

(8) It is concluded that there is a mechanism for the regulation of the red corpuscle content of the blood;

(9) That the regulatory mechanism is under nervous control, reacting to lack of oxygen as a stimulus;

(10) That the adrenal glands play a part in this mechanism;

(11) That the liver is the organ which supplies the body with red cells to meet its acute demands.

What polycythemia is present in duodenal ulcer is therefore dependent upon the liver mechanism, and this proves conclusively to my mind that duodenal ulcer is dependent to a degree upon the liver for its production.

The chief value of the blood count is in differentiating medical from surgical conditions. I am convinced that this procedure is more often responsible for indicating the necessity of surgery than any other single diagnostic method. It is simple, consumes but little time, and if it were universally employed, I am sure would be the means of saving hundreds of lives every year.

Roentgen rays: The final step in the diagnosis, and the one of greatest importance to my mind, as far as the patient is concerned, is the examination with the roentgen rays. If an ulcer cannot be demonstrated in this manner, I do not believe that it is surgical. An ulcer that has advanced to the point where a defect is constantly shown on the radiogram, has involved more than one coat of the gastric mucosa and the time has passed for a complete restoration of tissue and normal function by medicinal or hygienic measures. It is the one absolute method by which we can differentiate a medical from a surgical ulcer. Even copious hemorrhage from the stomach and intestines is *not* a surgical indication, unless the roentgenogram shows a defect. I have had three such cases, in which the hemorrhage was almost fatal; but the recovery was complete, and no evidence remained of gastrointestinal disturbance. In one case a similar hemorrhage occurred almost eight years before, after a heavy meal. There were no symptoms before or after to indicate the presence of ulcer. I recall disstinctly, in my service with Dr. Pick, of Berlin, seeing several pathological specimens of numerous varicosities of the venous plexus of the wall of the intestines, and some of them ruptured, producing hemorrhage. There were no varicosities elsewhere.

In our list of 425 cases, 83 have been studied on the fluoroscopic screen and radiographically after the bismuth-buttermilk-meal. A combination of the various methods have been used. We believe that a surgical lesion can always be demonstrated. An adhesion may be called an ulcer, and a pancreatitis may be called an ulcer, but they are surgical lesions nevertheless and the error is negligible so far as treatment is concerned. In the hands of a capable roentgenologist (and roentgenology is an extremely scientific art), I believe the information obtained is but little less reliable than that obtained from exploratory celiotomy. The absence of radiographic evidence of ulcer does not indicate the absence of ulcer by any means, but it surely indicates the presence of a medical and not a surgical condition. The indirect method as advocated by Carman in this country is valuable evidence in the diagnosis of medical ulcer. The following table is presented for study:

ROENTGENOLOGICAL FINDINGS, 83 CASES.

Filling defects (Stomach)	25
Incisura	4
Residue (6 hours)	38

	Opening			Patency		
	Immediate.	Delayed.	Not Seen.	Free.	Obstr.	Gaping
Pylorus	20	56	7	52	28	3

Position.				Form.		
Normal.	Vertical	Oblique.	Transverse	F. Hook.	T. Hook.	S. Horn.
30	41	10	2	42	27	14

Peristalsis.					Duodenal Cap.		
Normal.	Active.	Vigorous.	None.	Weak	Regular.	Irregular.	Not Seen
23	21	25	10	4	14	59	10

Tonus.			Size.			
Hyper	Hypo.	Ortho.	Small.	Med.	Large	Very Large
20	15	48	1	31	33	18

Tender Points.							
Duodenal.	Pyloric.	Gall Bladder	Epigastric	Greater Curvature.	Lesser Curvature.	O.	McBurney's Point.
48	22	15	9	1	4	7	2

After all diagnostic methods have been employed, I am sorry to say that even then a very large percentage of errors will result. A few years ago the statement was published that covering a period of years at the Massachusetts General Hospital, the records of that institution showed that only thirty some odd per cent. of the cases admitted were properly diagnosed as proven at autopsy. Just think of it, and this one of the greatest diagnostic institutions in the country! This should not only furnish us with much consolation, but should spur us on to greater efforts and more accurate methods.

In concluding, then, I would emphasize the following points particularly: There is sufficient evidence, both experimental and otherwise, to warrant the belief that the liver plays a very great part in the production of gastric and duodenal ulcer (the latter particularly) through its failure to render non-poisonous toxic substances which are formed there, due to disease of the liver cells themselves. The possibility also of a proteolytic enzyme which under certain conditions when unrestrained produces destruction of mucous surfaces. Mark this prediction, however, that in the near future a much closer relationship will develop between diseases of the liver and lesions about the pylorus and duodenum.

Let us not forget, either, that a differentiation between gastric and duodenal ulcer is most important, as opposed to the general belief. Gastric ulcers go on to scar formation and obstruction and frequently cancer, and duodenal ulcers usually to perforation,[1] so in the latter case if medical treatment is not quickly successful surgical treatment should be advised.

Finally, the medical treatment: This in the majority of instances concerns the pre-ulcer stage, and should be prophylactic. The people should be directed to partake of only two substantial meals daily, one in the morning, consisting of fruit, cereal, light coffee, bread and butter; only a light lunch at noontime, and the second chief meal at six o'clock, consisting of soups, plainly prepared fish or meats, fresh green vegetables, cooked fruits, and light puddings. Overeating and hasty eating is to be avoided.[1] Sufficient rest must be taken after meals. Both mental and physical relaxation is important, and daily evacuation of the intestinal contents is imperative.

This latter point suggests the subject of focal infection, without which in this day of fads no medical discussion is complete. Let me say, however, that all foci of infection should be vigorously sought and removed, regardless of any single lesion, for the effect on the general health. We have heard much recently about the teeth, tonsils, alveolar processes, etc., being responsible for practically every ailment under the sun, and as a result of this thousands of sound, useful teeth, and thousands of healthy tonsils are being sacrificed. The pendulum is swinging too far, and we are losing our common sense and judgment. We have been curing disease for hundreds of years and the only focus of infection removed was in the colon, and since the days of Hippocrates the cardinal principle of medicine has been elimination. Personally I do not believe that diseased teeth, tonsils, etc., are directly responsible for disease anywhere. Bad teeth are not primary in themselves; they depend upon faulty nutrition. A child with faulty digestion and suffering generally from malnutrition, is most likely to have bad teeth. The same rule applies to the adult. Good digestion and thorough elimination are conducive not only to good teeth, but to good health generally.

I think I can safely say that bad teeth, bad tonsils, etc., are the result of faulty nutrition, depending upon improper food, improper elimination, and improper absorption, brought about by primary derangement of the gastrointestinal tract; and is not this probably true of the other so-called "foci"? Are they primary? No matter from what infection we may suffer, the intestinal tract is called upon to do more work than any other organ of the body and must suffer. Remember that all of our waste matter, which is subject to all forms of bacterial life from within and without, passes through the colon. It is subject to irritants, to trauma, and to all forms of abuse. Then recall that the blood receives much of its nourishment through the same medium by the process of osmosis, and nature intended this supply to be pure. It does not require a very great stretch of the imagination to believe that impurities as well as bacteria enter the blood stream from the intestinal tract, and that infections of the teeth, tonsils, the alveoli, etc., *are not primary*, but on account of their construction and susceptibility are the first to suffer from an infectcion which arises primarily where? In that organ, which has two severely antagonistic rôles to play in the human economy—*the colon.*

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After resection of the sigmoid it is desirable to leave a tube in the bowel, passed up through the rectum before the abdomen is closed. If a piece of rubber dam is placed on each side of the gut and brought out through the wound it will provide a safe outlet in case of leakage.

CRANIAL FRACTURES.

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While the subject of fractures in other anatomic situations has been extensively studied and elaborated in surgical literature during the last year or two, little information of practical importance has been added to existing knowledge concerning fracture of the cranial bones. Casual search of available English literature of the present year (1916) reveals only three or four contributions of any consequence dealing with fractures of the cranium.

The skull has been described as "a superior expansion of the vertebral column, as if composed of four vertebræ the elementary parts of which are especially modified in form and size and almost immovably connected, for the reception of the brain and special organs of sense." The major portion of the cranium is composed of eight sections known anatomically as: (a) the occipital, (b) the two parietal, (c) the frontal, (d) the two temporal, (e) the sphenoid, and (f) the ethmoid bones, any one or more of which may be fractured by external violence provided it be of sufficient severity.

Regardless of the anatomic situation involved, cranial fractures according to their character and extent may be single or multiple, and are classified as: (a) linear, (b) fissured, (c) stellate, (d) depressed, (e) compound, (f) comminuted, and (g) perforative. Clinically they are divided into: (1) fractures of the vault, and (2) those of the base of the skull.

Fractures of the vault are usually the result of direct traumatism externally inflicted. The extent and character of the osseous damage will depend largely upon the anatomic location and the force and direction of the instrument inflicting the trauma, *e. g.*, a direct blow upon the skull with a hammer or other blunt weapon will produce injury of a character entirely different from that due to a fall with impingement of the head upon some solid object. Therefore, from the standpoint of both diagnosis and treatment, it is of the utmost importance to ascertain in every instance the manner in which the trauma was inflicted. Moreover, the anatomic facts must also be remembered: (a) that the cranial structure (excepting at the base) consists of two osseous layers, familiarly known as the outer and inner tables; (b) that fracture may involve either one or both these layers (in the mastoid and frontal regions, only); (c) that fracture of the inner without visible lesion of the outer table is not unknown. "The lines of fracture on the outside of a given skull are seldom any index as to what may be found on its inner surface."

It may be stated as a general proposition that as to causation basal fractures differ in no essential respect from those of the vault. Fractures of the base are much more frequent than hitherto believed, and a large percentage of vault fractures extend to the base; thus in an analysis of 470 cases Brun found basal and vault lesions associated in 75 per cent.; in Besley's series of 1,000 clinical cases such an association was recognized in only 33 per cent., "showing the difficulties of diagnosis of the exact location of the line of fracture." However, in seventy-four cases which came to necropsy both types were found associated in fifty-four, or 72.9 per cent.

Practically all the older and many modern surgical text-books contain the statement that vault fractures are exceedingly common in comparison with those of the base, an observation which is contrary to the clinical experience of most present-day surgeons. The multiplicity of motor driven vehicles, and the numerous accidents incident to the reckless manner of their operation, has caused a tremendous increase in the number of basal fractures. My experience in this respect may have been unique, but in nearly every head injury the result of automobile accident coming under my personal observation during the last few years, there has been fracture at the base of the skull. Some of the patients have recovered without operative intervention, others have been operated upon and recovered, still others have died without regaining consciousness. Thus it may be seen that while basal fractures may be legitimately considered as more serious than those involving the vault alone, the outcome with or without treatment is not invariably fatal as was formerly quite generally believed.

It is claimed by some observers that counter pressure from the atlas coincident with a blow upon the cranial summit, may cause extension of the line of fracture to the base of the skull and that the only way the basal lesion can be detected in such cases is by the employment of roëntgenography and fluoroscopy. According to Besley the present and accepted theories regarding the mechanism of the production of cranial fracture are based upon and embody two definite principles: (1) The inbending of the skull at the point of contact of the blow; (2) the bursting of the skull at a point some distance from the applied force.

The multitudinous and varied symptomatology of cranial fractures is so generally understood that repetition may appear supererogatory but brief outlines may be permissible. And in this connection it seems appropriate to reiterate the dictum that the damage sustained by the osseous structure, *per se,* is of comparatively slight consequence in comparison to the cerebral injury.

Both the general and the local symptoms depend largely for their origin upon the anatomic location involved and the extent of injury inflicted upon the cranial contents. Unconsciousness is usually noted immediately following the trauma, and may persist for minutes, hours or days; but as it does not invariably occur after severe injuries, and may follow slight trauma without fracture, its importance as a diagnostic sign in head injuries lies in ascertaining *when* it occurred, how long it lasted and, above all, whether it turned. Severe shock is an almost invariable concomitant. Delirium (even mania) may develop promptly, or may be a late manifestation; likewise headache may be present from the beginning, or be of subsequent development. Vertigo, nausea, vomiting, mental excitement, convulsions, local paralysis, choked disc, stupor, coma, temperature rise without corresponding change in pulse-rate and respiration, are among the manifestations usually observed. The increased intra-cranial pressure from extra-dural or subdural hemorrhage and cerebral edema will explain the development of the majority of the symptoms mentioned.

Obviously the purely focal signs depend entirely upon cerebral laceration or contusion, and hemorrhage with resulting edema and pressure. The artery from which bleeding most frequently occurs is the middle meningeal. In basal fractures free hemorrhage may be noted from the mouth, nose, ears, into the orbital cavity, etc. Spinal fluid may escape from the ears, and more rarely from the nose. In the series of 1,000 cases reported by Besley, blood and spinal fluid escaped from the ears in 316; free bleeding from the mouth and nose in 172; from the nose in 118; from the mouth alone in 53, making a total of 343. It occasionally happens, says Besley, that involvement of one of the cranial nerves may be the only sign present indicating fracture, and that the nerve most commonly injured is the sixth. In his series unilateral facial paralysis occurred thirteen times. The respirations showed nothing characteristic, ranging from 22 to 40, being higher in the fatal than non-fatal cases. The temperature curves were likewise unimportant; in patients who recovered the average was 100° F.; fatal cases, 102° F.; in seven the temperature was above 105° F., in two reaching 107° F. Protrusion of one eye occurred in nine cases. Patellar reflexes increased in 67, absent in 50; no change recorded in others. Babinski reflex observed in 55; Kernig sign in 8; general convulsions in 32; clonic convulsions of arm, 6; leg, 2; face, 7. Rigidity of legs in 29; of the neck, 29. Complete paralysis of facial muscles in 47; legs, 55; arms, 58.

The analysis made by Besley of the pulse-rate and pupillary changes appears sufficiently interesting and instructive to warrant interpolation verbatim:

TABLE 1.—ANALYSIS OF PULSE RATE IN ONE THOUSAND CASES.

Nature of Fracture.	Number of Cases	Average Pulse Rate
1. Fractures of the vault without depression, with recovery (average pulse rate 71)	6	50
	8	60
	14	70
	23	80
	18	90
	14	100 plus
2. Fractures of vault without depression resulting fatally (average pulse rate 113)	1	50
	1	60
	1	80
	1	90
	12	100 plus
3. Fractures of vault with depression with recovery (average pulse rate 92)	1	50
	8	60
	24	70
	39	80
	26	90
	51	100 plus
4. Fractures of vault with depression terminating fatally (average pulse rate 116)	2	40
	3	80
	1	90
	25	100 plus
5. Fractures of base with recovery (average pulse rate 81)	4	50
	16	60
	15	70
	21	80
	13	90
	10	100 plus
6. Fractures of base with death (average pulse rate 105)	1	14
	6	40
	2	50
	9	60
	17	70
	25	80
	22	90
	119	100 plus
	1	200

TABLE 2.—PUPILLARY CHANGES IN ONE THOUSAND CASES.

Pupillary Changes.	Side.	Number.	Average Per Cent.
Dilatation of the pupil...	Left..........	35	19.5
	Right..........	37	
	Unequal pupils.	123	
Loss of light reaction....	Both..........	72	8.5
	Right..........	8	
	Left..........	5	

"In this series of 1,000 cases, vomiting was a common symptom, and occurred in 361, or 36 per cent. of all cases. In eleven cases the vomitus was almost wholly blood."

In the diagnosis of cranial fracture, an accurate clinical history is of the utmost importance. One is able to thus determine the character of the instrument and the manner in which the trauma was inflicted, the approximate force applied, the location and probable extent of the injury. Where extensive laceration of the overlying soft tissues has been produced, with consequent exposure of the osseous structure over a considerable area, the diagnosis is apparent even to the tyro; but where the external tissues have merely sustained contusion, and especially if more or less tumefaction has already ensued, an expert may fail in accurate diagnosis based upon the clinical signs alone. It must be remembered that slight cranial irregularities and even depressions cannot always be identified by palpation through the overlying integument, and the difficulties are correspondingly intensified by the swelling, edema and exudation which soon supervene.

Too much emphasis has hitherto been placed upon the diagnostic value of the so-called "cracked metal" sound solicited by percussion over the area of supposed fracture. In my experience this sign has seldom been definitely obtainable, and its presence proves nothing.

In every instance where fracture is suspected, regardless of the anatomic location, roëntgenography should be employed, usually supplemented by fluoroscopy. By no other means is it possible for the clinician to be absolutely certain of the correctness or falsity of his provisional conclusions.

The most important—and unfortunately the most unsatisfactory—feature in relation to cranial fractures is the treatment. During the last few years, however, the pessimism exhibited by older authors has been supplanted by more optimistic views, and the *noli me tangere* attitude no longer prevails. Surgical history shows that during periods not far remote, operative invasion of the cranial cavity was considered unjustifiable; and especially in extensive trauma with considerable osseous destruction and with probable corresponding damage to the cerebral tissues, was it believed that the invocation of surgery merely hastened inevitable dissolution. The mortality from serious head injuries was then practically 100 per cent.

The intelligent application of more modern surgical principles has rendered possible marked reduction in the mortality attending cranial as well as nearly all other lesions amenable to operative intervention. In the series of 1,000 clinical cases recorded by Besley the mortality was 53 per cent. In 239 cases of brain injury reported by Sharpe, 227 of which were cranial fractures, the mortality was 30.7 per cent.; and, excluding moribund patients who died within three hours after admission, the mortality was only 19 per cent.

The statement that every patient with cranial fracture should be subjected to operative treatment, would perhaps be further from the truth than the belief of older surgeons that operation should never be undertaken following cerebral trauma. In no department of practice is greater surgical judgment and skill demanded than in cranial and cerebral lesions. In doubtful cases, where the symptoms are obscure and no observable osseous depression exists, the decision to operate or not to operate must be made by the surgeon after due consideration of the clinical and röentgenoscopic findings. In all depressed fractures, with or without immediate symptoms, and in all compound, comminuted and perforative fractures, immediate operation should be performed. However, it must not be forgotten: (a) that rarely compression may result without fracture; (b) that simple linear fracture with extradural or subdural hemorrhage may produce results similar to those due to depressed fracture; (c) that the so-called inner table may be extensively damaged without observable external osseous injury; (d) that the extent of integumental trauma is no index to osseous and cerebral damage.

A safe and conservative rule for general guidance is to operate in every case of cranial fracture in which the symptoms are indicative of cerebral laceration or compression. In vault fractures the opening should be made at the site of injury; in basal fractures requiring surgery the subtemporal decompression operation is the procedure of choice. Drainage is necessary in all operations where the cranial cavity is invaded and the membranes incised.

In cases where palliative treatment seems advisable, or must be practiced to the exclusion of operative methods, absolute rest in bed, the application of ice-bags to the head, purgation, enemata of hot saline solution and black coffee, morphin hypodermatically to assuage pain and promote quietude, will be found the most advantageous measures. Although not strictly a palliative method of treatment, lumbar puncture is oftentimes useful in relieving the increased intracranial pressure resulting from slight edema and hemorrhage; but this procedure is not without danger and should be employed with extreme caution. Fatalities have followed the apparently simple procedure of spinal puncture where the intracranial pressure exceeded that of the fluid in the spinal canal, the vaso-motor centers being overcome from blocking of the foramen magnum resulting in fatal cerebral anemia. However, "if there exist the proper relationship or ratio between intra-cranial pressure and the pressure of the cerebro-spinal fluid, lumbar puncture is comparatively safe." It seems probable that in simple cerebral edema resulting from contusion, with slight increase of intra-cranial pressure, complete relief might be afforded by lumbar puncture alone.

Where the initial symptoms are indicative of more or less serious cerebral damage, early operative intervention is imperatively demanded, *i. e.*, while the pulse-rate remains low, before intra-cranial pressure is markedly increased, before the blood pressure is lowered, and before the dangerous stage of medullary compression and cerebral anemia has been reached. Late operations in cerebral injury due to cranial fracture are for the most part followed by disastrous results. Murphy states that if the brain be so compressed that its circulation is totally impeded for twelve minutes, the patient will certainly succumb because the brain tissue cannot withstand total anemia for a longer period.

The technic of cranial surgery requires no further amplification, but there are certain features upon which greater emphasis might be placed. The prevention of infection by the most rigid adherence to modern principles of asepsis is one of the primary essentials to a successful outcome. In compound fracture the wound should be thoroughly cleansed before invading the cranial cavity, to minimize the danger of infection from without; if extensive cerebral laceration has occurred, after elevating or removing the damaged osseous structure, the cerebral tissues so devitalized as to be beyond hope of repair should be carefully excised. Adequate provision for drainage is imperative in every instance where the dura is incised, which should be always done if there be evidence of increased subdural pressure. A decompression operation without dural incision rarely accomplishes the desired result.

Case I. A male, aged thirty-two, was admitted to the Louisville Public Hospital without any history excepting that he had received a head injury in an automobile accident and had been rendered unconscious. He was still unconscious when admitted; his breathing was sterterous, blood issued from his ears, mouth and nose; his pupils did not react to light; pressure upon the supraorbital nerve elicited slight response. Based upon the clinical findings, and especially considering the stuporous condition of the patient, the provisional diagnosis of extensive basal fracture was made, and under the circumstances I refused to operate, as it was believed the injury would prove quickly fatal.

The patient was placed in bed and instructions given that he be carefully watched. After being thoroughly cleansed with alcohol, his aural cavities were "plugged" with pledgets of sterile cotton. There was considerable subconjunctival hemorrhage, with a tremendous amount of edema around the right eye. The pulse was below 60; temperature and respirations showed nothing worthy of note. I believed death would supervene within a few hours, certainly before the expiration of two days.

The following morning the patient was answering questions more or less intelligently, and during the afternoon became thoroughly rational. There was no elevation of the temperature at any time. Two days thereafter, the only evidence that a fracture of the cranium had occurred, was the discharge of about two teaspoonfuls of spinal fluid from the right ear.

In this case there was undoubtedly a fracture extending into the petrous portion of the temporal bone (middle fossa) and also probably involving the anterior fossa. Contrary to my instructions the patient insisted upon leaving the hospital within a week. All the symptoms had disappeared, and the man said he felt perfectly well. It is my opinion that this patient will have trouble later in the form of epilepsy or other cerebral disturbance. Murphy required patients who had been rendered unconscious to remain in bed six weeks.

Case II. In the ward the same day was another man, aged forty-four, who gave the history of having been struck on the head by a moving crane two days previously. He was rendered unconscious, and for some unknown reason was taken to the county jail, where I understand he was allowed to remain in an unconscious state for forty-eight hours before being sent to the hospital. However, this is questionable. When I saw the patient consciousness had returned. Examination revealed a superficial abrasion over the left parietal eminence which had then partially healed. So far as could be ascertained the man was perfectly normal with the exception that he was totally deaf in his left ear.

The patient was placed in bed for further observation, as there seemed no necessity for immediate operation. The next morning he said that he had passed a very uncomfortable night; that he could not sleep, and a severe headache had developed. The second day headache was more violent, and 1/4 grain morphine hypodermatically failed to afford relief. The third day headache had become so intense that, although the patient had no other manifestations—no pupillary symptoms, paralysis nor anything indicative of cranial fracture excepting headache and left ear deafness—I decided to operate upon him without further delay. His temperature had gradually risen to 102° F., pulse 100. The operation revealed a linear fracture, which extended downward into the petrous portion of the temporal bone; the middle meningeal artery was completely torn across and had to be ligated; hemorrhage had not been very extensive. The bulging dura did not pulsate, and, when incised, a tremendous amount of edema was found, but there was present no blood clot. Two drains were introduced, one just above the ear, the other near the upper angle of the wound, where some trouble was experienced in controlling hemorrhage from the bone.

The morning after the operation the patient's pulse and temperature had declined to normal, and have remained so since. He slept well the first night after the operation, and remarked that "it was the best night he had spent since coming to the hospital"; and his wife said that he seemed more normal than at any time since the accident. The operation was performed seven days ago; the drains have been removed; the wound is healing normally; the patient's physical condition has improved, and he wants to leave the hospital.

Murphy recently suggested a method for arresting hemorrhage from the middle meningeal artery, which seems a most logical procedure. He says that in cranial fracture with injury to the middle meningeal, hemorrhage can be arrested by simply ligating the external carotid, the middle meningeal being a branch of the external carotid.

Case III. A male, aged forty, was delirious or crazy when admitted and soon afterward apparently attempted suicide by butting his head against the wall. The diagnosis of cranial fracture had been made before the patient came under my observation, but the correctness of this opinion seems open to question. Of course it is very easy to say that a patient has a fracture of the skull, then let the blame for not operating fall upon the surgeon who says he has not.

This patient was admitted with the history that he had fallen from a window and sustained a head injury; he became so violent that he had to be restrained in the psychopathic department for two days; when removed to the surgical ward he again became violent, and by his own acts when unobserved the wound originally produced by the fall was reopened. Roëntgenoscopy could not be employed because the man was in such mental condition that he could not be kept quiet for a sufficient length of time. The diagnosis is still uncertain, and under all the circumstances immediate operative intervention seems inadvisable.

Of the two cases of cranial fracture reported, one was operated upon four days after infliction of the trauma and recovered. The other was not operated upon and also apparently recovered. How the patient in Case 1 happened to recover I do not know, unless it be there was absence of cerebral laceration. It was thought the patient would certainly die in a short time, and extensive basal fracture appeared so evident that röentgenoscopic investigation was not instituted, which of course is now regretted.

In Case 2 three *x*-ray plates were made, but the report from the laboratory stated that no fracture could be demonstrated. Operation revealed a linear fracture without any depression. When the severe headache developed, it was thought considerable intra-cranial hemorrhage had occurred. The fact that the dura did not pulsate was sufficient justification for its incision. When the dura is tense and non-pulsating, a decompression operation without dural incision is usually unproductive of benefit.

The patient in Case 3 is still under observation. The scalp wound has entirely healed: his mental status is gradually improving under treatment, and the uncertainty in diagnosis will be clarified by employment of the *x*-ray and fluoroscope so soon as his condition will permit.

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THE VALUE OF THE X-RAY AS AN AID IN THE DIAGNOSIS OF URINARY CALCULI.*

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The experimental stage of the Roentgen ray as a means of diagnosis has passed, and day by day it is coming into its own as the crowning achievement of progressive medicine of the nineteenth century.

In considering the indications for *x*-ray examination of the urinary tract the discomfitting fact is that a severe lesion is often present when it is least suspected; the result being that frequently we do not know when it is necessary and when it is not necessary to resort to every means at our command in an attempt to arrive at accurate conclusions.

Bransford Lewis, in an article on "Kidney Stones," says: "In the first place put no faith in symptoms, put your trust in reliable returns given by searching physical examination, including modern methods of internal inspection and investigation." He further says that "Identification of pus or infection in either kidney commonly indicates the application of *x*-ray photography to that side with or without the coincident use of radiograph ureteral catheters, or collargol injection for further elucidation."

Squier, of New York, says: "The so-called classic symptoms of renal calculus—hematuria, renal colic, and fixed pain—are so often absent as to be a negligible factor in arriving at an early diagnosis. More minor symptoms must attract us to the kidney as a possible seat of disease."

Squier quotes L. G. Cole as follows: "Most of the cases in which renal calculi have been demonstrated by the *x*-ray have had no symptoms that were sufficiently characteristic to justify an operation, and only those that engage in the ureter, or obstruct the pelvis cause typical renal colic."

Squier, commenting on Cole's statement, says: "Such being the case, a patient complaining of slight pain in the back, tenderness over the kidney, a sense of weight in the back, which is increased by jolting, or the presence of even a trace of albumen, should suggest suspicion of a calculous disease and be given the benefit of a complete routine examination of the urinary tract."

Hyman, of Mt. Sinai Hospital, New York, says: "The information obtained by careful history, physical and urinary examination may be of an entirely negative character and still serious disease be present. It is not generally recognized that stones may remain latent in the kidney for a long time, reaching a large size, and even destroying the parenchyma without producing focalizing symptoms. According to Cabot pain is absent in about 10 per cent. of the cases of renal calculus. Renal colic is present in about 50 per cent., and pain without colic in about 30 per cent."

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*Read before the Chattahoochie Valley Medical and Surgical Association, July 12, 1916

Hyman further says: "Urinalysis gives valuable data in many of the cases, but it must be borne in mind that stones may be present with only microscopic changes in the character of the urine. Albumen, pus, and blood are present in over 80 per cent. of the cases. Stones may exist without the presence of red blood cells in the urine. It will thus be seen from this cursory review that unless more specific means for diagnosis are adapted many cases of renal calculus will be overlooked or mistaken for other conditions, and consequently many patients subjected to needless operations. Failure to take proper cognizance of these facts will still lead many to treat renal calculus for lumbago, sciatica, cholecystitis, appendicitis, and other conditions."

Statements such as I have quoted coming from men of recognized ability bring us face to face with the conclusion that many kidney cases are going on to disastrous results, which might be relieved if we were only more painstaking in our efforts to ascertain the true status of affairs in their incipiency.

Sequence of examination.—As suggested by Hyman in the examination of a suspected urological case, "it is advisable to carry out the different steps of the examination in their proper sequence. By so doing considerable time is saved, and unnecessary re-examination will often be avoided. For example, it would be unwise to cystoscope a patient before resorting to roentgenography; for should the latter demand a pyelogram or ueterogram for confirmation, it would entail a second cystoscopic examination; cystoscopy, ureteral catheterization, and uretero-pyelography could all have been combined at one sitting."

Relative value of examination.—Drs. Shropshire and Watterson, of Birmingham, in a recent article state: "The cystoscopic examination and functional test, together with careful urinalysis, is by far the most important. Next would come the radiographic examination, and then would be placed in line the physical findings and the patient's history."

Lilienthal, of New York, who reverses the order of relative value, says: "After radiography comes the cystoscopic examination of the ureters and kidneys. This sequence, radiography first and cystoscopy afterwards, should be strictly observed because cystoscopy is apt to be attended with greater inconvenience, not to say danger to the patient, than modern examination with the *x*-ray."

Hyman says: "Roentgenography, cystoscopy and ureteral catheterization, and pyelography are indispensable diagnostic agents in the examination for renal calculus. Of the three roentgenography is the most valuable procedure." He further says: "The roentgen rays will demonstrate the presence of renal calculus in probably 98 per cent. of the cases."

Thompson Walker has recently stated: "In an aseptic case the absence of a stone shadow, after two or more examinations when a plate of the first quality has been obtained, excludes all but a pure uric acid calculus. When the urine is alkaline the absence of a stone shadow excludes a calculus of any composition, for it is certain that phosphates will have been deposited upon a uric acid calculus and render it opaque to the roentgen ray."

Carman quotes Fenwick as saying: "One of the most distressing of failures in urinary surgery is to cut into a kidney and mutilate it, perhaps irreparably, in order to find a stone which has long left that organ and traveled down the ureter; and yet this must happen in at least 22 per cent. of all cases of renal stones if the *x*-ray expert is not called upon to help in the diagnosis."

As to the relative value of the cystoscopic and radiographic examinations, my own opinion is that they are equally indispensable; and because of the valuable information that can be derived from both procedures, although frequently of an entirely different character, I would hesitate to give either precedence.

I think that urologic diagnosis would be seriously crippled if either were eliminated, and that its future is materially dependent upon the proper correlation of both methods.

Advantages of the method.—(1) It is painless. (2) it gives the location, size, and number of stones. (3) It may show other pathological conditions not suspected. (4) It gives an idea of the condition of the opposite kidney and ureter, especially if used in conjunction with pyelography. (5) Frequently pain is referred to the opposite kidney or ureter, and the lesion will be found in the supposedly sound organ.

Disadvantages.—(1) It is more or less expensive depending largely upon the number of plates made. (2) It is not infallible. (3) It is not always accessible. (4) A severe lesion of the opposite kidney may be present and give no radiographic evidence, therefore it is not to be relied upon to the exclusion of other methods.

Possible causes of errors.—(1) Shadows cast by opaque bodies in the intestinal tract. This error can be avoided by administering a vegetable laxative the day before the examination. (2) The heavy shadows due to gas in the colon may obscure the light kidney outlines, or soft calculi. This source of error may also be eliminated by proper purgation and administration of enemas. (3) Imperfect technic and defective plates. It is essential that the emulsion on the plates be even and without spots; and that the developed plate shows clearly the vertebral column with its transverse processes, the last two ribs, the outer border of the psoas muscle, and the bony structures of the pelvis. (4) Phleboliths, gallstones, foreign bodies in the appendix, cheesy deposits in the calices of the kidney due to tuberculosis, papillomata and warts on the skin, calcified costal cartilages, etc., may cast shadows which will require differential diagnosis. Aside from their physical characteristics, with rare exceptions such shadows can be differentiated from those cast by renal or ureteral calculi by showing their relation to the opaque catheter, or the injected ureter and pelvis. (5) Occasionally in an unusually large or fleshy person a negative finding will be made when a stone is present. (6) In case of uric acid stones, no shadow may be present on the radiographic plate.

Interpretation of the plate.—In order to more accurately localize the position of shadows, Harry Fenwick divides the loin space into two divisions by a vertical line extending from the crest of the ilium to the ribs. This is known as the mid-vertical line, and Fenwick formulates the following axioms: (1) Shadows outside the mid-vertical line are usually cast by contents of the bowel. (2) Shadows inside the mid-vertical line are usually urinary shadows, or rarely cretaceous gland shadows. (3) Shadows arranged along the mid-vertical line or near it are not infrequently collections of stones in the cortical portion of the kidney.

If the results are positive a confirmatory examination should be made, either with stereoscopic plates made with an injection of an opaque solution into the ureter and pelvis of the kidney, or with an opaque catheter in situ.

If the shadow is in the lumen of the ureter or pelvis of the kidney it will be obliterated or obscured in the pyelogram. If it is extra-ureteral or extra-renal its position with reference to the shadow of the injected ureter and pelvis will be shown.

In ureteral and vesical calcuculi a considerably higher per cent. of failures is recorded from the radiographic examination.

Stewart quotes Braasch and Moore, of the Mayo Clinic, as saying, "It is doubtful if an accurate diagnosis of stone in the ureter can be made from roentgenographic data alone in more than 60 per cent. of the cases." Stewart does not accept this as final and says: "In Cabot's 127 cases recently published, 8, or 6 per cent., were persistently negative. New York roentgenologists such as Caldwell, Cole, Jaches, and LeWald do not concede failures in any such high percentage. Baetjer, of John Hopkins, however, states his negative findings in positive cases amount to about 25 per cent."

Stewart further says: "While I am not in position to give accurate figures, my experience would suggest failures in about 5 per cent. of renal and ureteral calculi, and about 10 to 15 per cent. in vesical calculi."

Interpretation of shadows along the course of the ureters is much more difficult than in the region of the kidney, the reasons being that adventitious shadows are much more common, especially along the lower ureter, and that the shadow is often superimposed upon the bony structures of the pelvis. The same reasons apply to shadows in the bladder region. In addition the bladder stone often consists of pure urates, which it is difficult, if not impossible, to detect by the roentgen ray. A calculus not visible in the ordinary radiogram may occasionally be seen if the bladder be inflated before making the radiogram.

Kummel suggests the injection of an opaque silver salt into the bladder and making a radiogram the following day. His theory is that the calculus will become coated with the colloid silver, and thus project a shadow on the plate.

Abdominal Surgery

The greatest factor to be considered in lowering the death rate in this and all other forms of surgery is the surgeon. His judgment as to what cases should be operated upon and what cases should be left alone, as to the time to operate and the time to wait, and as to how much and how little should be done; the time saved in operating on the very weak and those suffering from severe shock; the care and ease used in handling the patient; the confidence instilled into the already frightened and nervous individual, and many other things that cannot be thought of all make a great difference in the death rate.—Ezra C. Rich in *Colorado Medicine*.

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WALTER M. BRICKNER, M.D., Editor

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PAIN IN THE ARM.

It is not generally appreciated, as it should be, that pain in the arm is very often, perhaps most often, a surgical affection rather than the "neuritis" or "rheumatism" for which it is usually (mis)-treated.

Brachial neuritis is a very real disease, to be sure, but it is comparatively uncommon, and the diagnosis can not be accepted unless there is distinct nerve tenderness, definite pain distribution and —if the condition has lasted long—sensory, motor or trophic disturbances.

Rheumatism without articular inflammation, i. e. so called muscular rheumatism, is an altogether untenable diagnosis if the pain is limited to one arm.

Among the less common surgical affections that may cause pain in the arm are cervical rib, localized periostitis of the scapula or humerus, and inflammatory or neoplastic lesions of one of the bones. There is an affection of the long bones which is apt to escape diagnosis and which, so far as we know, has not been described—chronic, sterile, afebrile, medullary abscess. This produces severe pain, and is marked by exquisite local bone sensitiveness. Roentgenographically the appearance is that of an osteoperiostitis, the thickened corticalis encroaching upon the medullary cavity. The pus, which produces no shadow, lies above or below the zone of thickened cortex.

By far the most common surgical lesion causing pain in the arm is subacromial (subdeltoid) bursitis. This, an affection of adult life, often appears to arise spontaneously, although it probably has its origin in some trauma—often a comparatively mild internal violence. Although pain in the shoulder is also common in this affection and there usually is, or has been, more or less—sometimes very pronounced—disability of shoulder function, these are not constant symptoms. Nor, usually, is there any local swelling or other deformity about the shoulder. The most constant symptom is pain in the outer or anterior aspect of the arm. When this pain extends into the forearm or even the hand it is very apt to be mistaken for that of neuritis, especially if there is an associated atrophy of the deltoid and the spinati. In many, but by no means all cases, of subdeltoid bursitis, a roentgenogram will reveal the tell-tale subbursal lime deposit concerning which there have been so many mistaken notions. This lime deposit, for the production of which we may yet find some predisposing metabolic fault, appears to us to be also traumatic in origin, arising from an injury to the supraspinatus (occasionally the infraspinatus) tendon associated with trauma to the overlying tendon, as we have demonstrated surgically and histologically.

We shall not here refer at length to the diagnostic aspects of subdeltoid bursitis, elsewhere described, nor to the various other conditions that may cause pain in the arm. The purpose of this editorial is to call attention to the desirability of looking for that very common affection, and of seeking the aid of the Roentgen ray in all cases of pain in the arm.—W. M. B.

THE TRANSVERSE ABDOMINAL INCISION.

The transverse abdominal incision of Sprengel, especially as it has been modified by Perthes, seems to be growing into favor among surgeons, and deservedly so for it possesses certain distinct merits and no very serious drawback. A. V. Moschcowitz (*Annals of Surgery*, September, 1916) is the latest to extol the transverse incision in the surgery of the upper abdomen, where he has employed it in a large number of cases during the past six years.

Moschcowitz emphasized certain anatomical facts that make the transverse incision more "physiological" than the vertical. He states, quite properly, that "the sheath of the rectus" should not be regarded merely as a sheath but as the aponeurotic expansions of the external and internal oblique and the transversalis muscles; and, since the pull of these muscles is lateral it is more physiological to incise their aponeuroses transversely than longitudinally. Theoretically this is true but, in fact, the fibers (or "little tendons," as Moschowitz calls them) of these aponeuroses are not disposed transversely alone, but decussate at various angles of obliquity; and *when these aponeuroses are divided transversely they gape even more than when the incision is vertical* (*longitudinal.*) Moreover, if it is physiological to incise these aponeuroses transversely it is certainly unphysiological to divide the rectus muscle transversely.

All those who have advised the transverse incision have based its merit in part upon the transverse disposition within the rectus sheath of the intercostal nerves (supplying the rectus and peritoneum) which, therefore, are liable to injury by a long vertical incision. Usually these nerves can be drawn aside; and if one or even two of them are cut or torn in a long rectus-splitting incision this produces no ill-effect, so far as we have been able to note.

The greatest disadvantage of the transverse approach is that it takes much longer to execute than the vertical, since it requires the placing of two rows of fixation sutures to control the vessels in, and prevent the retraction of, the rectus. To balance this admitted drawback Moschcowitz tells us that though it takes longer "to get in" it is much easier "to get out" with the transverse incision. Admittedly it is sometimes extremely difficult to suture the peritoneum in a vertical incision if the patient is obese or is straining. Then the peritoneum is apt to tear at the sutures, leaving gaps that needs must cause omental or other attachments and adhesions. All abdominal surgeons are familiar with the time-consuming difficulties that present in such cases—difficulties that are not encountered with the transverse division. But we must remind Moschcowitz that although with the transverse incision it *always* takes long "to get in," with the vertical incision it only *sometimes* takes long "to get out."

Cosmetically, the transverse incision has the advantage; it leaves a much less conspicuous scar.

The exposure secured by the transverse incision is quite satisfactory, especially if it is carried as far beyond one rectus in either direction as may be needed. It is therefore useful for operations upon the stomach, the colon, the pancreas. To reach above or below it requires much the same retraction as the vertical incision requires to reach tissues to one or the other side. For cholecystectomies we still incline to prefer the vertical incision. It affords at least as good exposure of the common bile duct and, if carried up to the costal border itself, it allows eversion of the gall-bladder and much of the liver, an important aid in the operation which, necessarily, the transverse incision scarcely permits. Nor have we ever found it necessary to add to the vertical incision cross curved or oblique cut for any operation on the bile passages. For large tumors of the bowel occupying the loin, the transverse incision, liberally extended, is very acceptable.

When all is said and done, almost any intraabdominal operation can be performed through either a vertical or a transverse incision. Either can be made to give adequate exposure.

The "physiological" considerations are, as we have pointed out, theoretical rather than practical. Properly sutured and healed *per primam*, the abdominal wall is restored without loss of substance or function whether it is divided longitudinally or transversely.

It seems to us that neither mode of approach should be adopted as a routine to the exclusion of the other. Both are good; and the surgeon should be facile with both and should employ now one, now the other, as the individual case may suggest. —W. M. B.

ANNOUNCEMENT.

SPECIAL ISSUE DEVOTED TO OBSTETRICS AND GYNECOLOGY.

The November issue of The Journal will be a special number devoted exclusively to Obstetrics and Gynecology. It will contain many interesting articles by prominent specialists, most of them written for this issue.

Surgical Suggestions

Portal vein thrombosis is probably not always fatal. Occasionally patients with all the classical signs and symptoms of suppurative pylephlebitis spontaneously recover.

The healing of pus pockets and suppurating sinuses after appendicitis is facilitated by cleansing them daily with injections of hydrogen peroxide; but this, of course, should not be undertaken until the sinus or pocket is surrounded by a solid wall of granulations.

A yellow or yellow-gray membrane appearing in a wound should be carefully investigated. It may be a diphtheria infection which, though rare, should always be thought of. It is advisable to administer large doses of antitoxin without waiting for laboratory confirmation of the diagnosis for, unless quickly dealt with, such an infection is usually soon fatal.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

PAY CLINICS.

The extension of clinical facilities for paying patients is at present agitating the minds of many interested in medical economics. Under various plans proposed, ambulant patients of moderate means, who are not entitled to free dispensary treatment under ordinary circumstances, are to have the opportunity of consulting specialists, whose office fees are beyond their means. In most instances, this type of clinic is restricted to those whose annual income is $1,200 per annum or less.

While there are fears that a clinic of this character actually competes with the family practitioner, the experiences in Boston, Brooklyn, and Cleveland indicate that pay clinics undermine quackery, reduce drug store medication, afford better service to patients, and actually yield scientific possibilities advantageous to the general practitioner endeavoring to make proper diagnoses upon patients unable to afford the special investigations or specific diagnostic services.

In connection with this plan, there is the admirable principle of remuneration for the physicians, specialists or otherwise, whose services are being utilized in the extension of the project. Moderate charges are made for *x*-ray work and for unusual laboratory investigations. The earnings of such dispensaries are in some instances divided between the dispensary and the workers. In some institutions the workers receive a definite nightly compensation for a definite period of time of service.

With reference to the legality of pay clinics, as violating the proper interpretation of dispensary use, a recent decision by the Attorney-General of New York State is quite noteworthy. Inasmuch as dispensaries have been classed as charitable institutions, their abuse has been the subject of considerable comment and discontent. To establish, therefore, in a dispensary a pay clinic would at first thought appear to be a violation of the spirit in which such institutions were organized for the benefit of the public.

The Attorney-General unhesitatingly states that a charge in itself would be lawful. "Whether a person who pays one dollar for treatment at such a dispensary is a proper object for charity, depends entirely upon the circumstances in each individual case. If all that patient can afford to pay is one dollar, and he may obtain treatment by a specialist for that amount at a dispensary, while treatment by the same specialist at the patient's home or the physician's office would be entirely above his means, I do not see why such patient cannot avail himself of the services of such specialist."

He further expresses himself as of the belief that dispensaries of this type should be "encouraged and assisted rather than hampered and hindered."

This opinion is one of the first utterances on the legal aspects of pay clinics. The problem now exists of satisfying the profession of the justice of pay clinics and of convincing them that such institutions do not tend to undermine the sources of private practice.

A theoretic judgment upon a matter of this kind is naturally prejudiced by one's own relations to medical practice. To the man approaching the subject with an open mind, it becomes necessary to investigate the facts as thus far developed in cities where pay clinics have already been instituted. An analysis of the results thus far obtained suffices to show that many of the fears are groundless and that the advantage to be derived by both physicians and patients far outweigh any disadvantages which would seem to exist on theoretic grounds. There is every reason to believe that pay institutions are to become more numerous and will occupy a prominent place in the development of dispensary systems.

There lies a latent danger in arbitrary decisions on the part of institutions, wherefore it becomes essential that dispensary workers have every opportunity to co-operate in working out the basis of pay clinics and establishing the rules and regulations and in developing the policies which are to be pursued. Only by united efforts of those vitally interested in the question is a rational plan to evolve which will satisfy the medical profession and yield the most fruitful results to society. The social advantages to the pay clinic are inestimable and the benefits to the general practitioner may be of little less value.

Experience has shown that there is reason in going slowly in instituting paid dispensary service. The first clinics developed merely took care of such specialties as venereal diseases or eye diseases. The great number of general clinics existing manifest the importance of other specialties equally important to the great middle class public, which are equally entitled to consideration in the development of out-patient departments.

The economic basis of practice is the charge made to the well-to-do and on this basis has been justified the vast amount of gratuitous service given by physicians to the poor, in addition, of course, to the actual personal return secured by reason of experience or by the acquisition of a mass of clinical material available for teaching purposes. The largest proportion of the community, however, does not come within the delimination of the pauper class or extremely poor, but is represented by the self-respecting individuals whose insufficient margin of income does not enable them to take the advantage of the best medical service or continue to receive such service for a long period of time.

The standards of medical service today are higher than ever. The growth of the habit of consultation is indicative of the importance placed upon accurate diagnosis and improved methods of treatment. The extent to which the general public is capable of taking advantage of these two factors in modern medicine is restricted because of economic pressure. This is the idea which underlies the great questions of health insurance, accident insurance, workingmen's compensation acts, employers' liability acts, and similar movements for social insurance.

The facts are undeniable and in the interests of efficient social service and social justice, it is proper to establish pay clinics to give the fullest opportunity to the bulk of the population to receive the special services which are needed at a fee which is within their means and with a distinct gain in the character of the services performed. There is naturally a suspicion on the part of many that to make a statement of this character is antagonistic to the best interests of the profession; that it is a reflection upon the nature and type of service now being offered and performed by the bulk of the physicians in the country.

It is only the exceedingly sensitive individual, who is thinking in terms of money rather than in degrees of service, who does not properly inventory the shortcomings of the profession. It is no disgrace to recognize weaknesses for the purpose of developing strength. It is no crime to criticise conditions arising from economic forces with a desire to placing greater facilities at the disposal of the profession. How many physicians actually own microscopes, possess an X-ray outfit, have a clinical laboratory, or the apparatus essential for the diagnosis of pathological specimens? The percentage is not sufficiently large to warrant a feeling of superiority in equipment beyond friendly criticisms, and yet, these are, today, requisites for the best types of medical and surgical service.

The surgeon has unhesitatingly criticised the standards of surgery in this country and the Fellows of the American College of Surgeons do not hesitate to demand higher standards for the practice of surgery. They would indeed limit the practice of this art to those especially trained in particularly well equipped hospitals. The underlying idea is certainly the improvement of surgical service in the interests of the general public. And this, after all, is the very basis of all our efforts to improve the standards of medical service. The pay clinic is an institution for cooperation, for team work in diagnosis and treatment, which today is possible only for those of large financial means. The same opportunities should be afforded to all and for this reason the opposition to the pay clinic must naturally succumb to the greater interests of the suffering public.

Book Reviews

Man An Adaptive Mechanism. By George W. Crile, F.A.C.S., Professor of Surgery, School of Medicine, Western Reserve University; Visiting Surgeon to the Lakeside Hospital, Cleveland. Edited by Annette Austin, A.B. Octavo; 387 pages. New York: The MacMillan Press, 1916.

Crile has written this book upon the hypothesis that man is a mechanism, obeying the laws of physics, and that essentially this mechanism functions as an energy transformer. He elaborates this theme, pointing out that the individual is, moreover, an adaptive mechanism, dependent for its life and its death upon all the physical conditions of its environment. As new life comes into contact with existing life, the varied stimuli of the world create in the plastic brain of the new-born babe a great number of "action patterns," each the projected brain impression of action executed during a wakeful moment. Furthermore, energy transformation produces "acid by-products." These by-products are neutralized by the respiratory, adrenal, and liver systems—as measured by the H-ion concentration of the blood. The H-ion concentration affects the stimulation or inhibition of the higher brain centers, which, in turn, drive the kinetic system of man. In this way the cycle is completed.

During sleep this train of phenomena is altered. The brain is spared shocks (and acid productions) since no stimuli by contact or "distance ceptors" reach it. Crile argues, therefore, in anociation he simulates for man the conditions of sleep in that he isolates the brain by dulling pre-operative sensibility, by blocking the "distance ceptors" with general anesthesia, and by blocking afferent nerve paths with local agents.

Treatise on Fractures. By John B. Roberts, A.M., M.D., F.A.C.S., Professor of Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; and James A. Kelly, A.M., M.D., Attending Surgeon to St. Joseph's, St. Mary's, and St. Timothy's Hospitals, Associate in Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine. Octavo; 677 pages; 909 illustrations. Philadelphia and London: J. B. Lippincott Company, 1916. Price, $6.00.

The purpose of the authors is to present a clear view of the entire subject of fractures, particularly in the light of recent discoveries, and to emphasize accurate scientific procedures, operative or otherwise, according to the nature of each injury.

The first chapter deals with the general aspect of the subject, considering the etiology, symptomatology, and treatment of all the various types of fracture. The successive chapters take up the fracture-injuries of each bone, adequately illustrating all the essential points involved in the consideration of each subject. Vertebral fractures are specially well presented; the photographs of the zones of anesthesia produced by the respective vertebral lesions are accurate, valuable, and striking. Each extremity is discussed separately, also the skull, thorax, etc. A short but valuable chapter on child fractures and another on gunshot fractures complete the book.

The volume is well planned, well written; the text is clear, the accompanying illustrations are very good. The book should prove of value to the student and practitioner.

Maladies des Organes Génitaux de l'Homme. By Pierre Sebileau and Pierre Descomps, Professors of the Faculty of Medicine, Paris; Surgeons to the Lariboisière and Paris Hospitals. Octavo; 675 pages; 150 illustrations. Paris: T. B. Baillière and Sons, 1916. Price, 15 francs.

This large volume represents one of a series in a general system of surgery, other volumes of which have been here reviewed. It is an exhaustive survey of genitourinary diseases. While there is no new point of attack in the scheme of this work, it aims to consider the disorders of each organ separately, and to bring before the reader the best of new advances in pathology and treatment. About 100 pages are devoted to a splendid consideration of testicular tumors. Operative indications are clearly presented, and technical procedures are discussed lucidly. Acute and chronic lymphangitis, gangrene of involved organs, torsion of the spermatic cord, the therapy of the tuberculous testis—these matters are treated in a thorough and scholarly manner and in a style that is fresh and clear.

Skin Cancer. By Henry H. Hazen, A.B., M.D., Professor of Dermatology in the Medical Department of Georgetown University; Professor of Dermatology in the Medical Department of Howard University, etc. Octavo; 251 pages; 97 text illustrations and one colored frontispiece. St. Louis: C. V. Mosby Co., 1916.

This is an excellent monograph upon the cancerous and pre-cancerous dermatoses. The text is didactic, systematically written, and covers every phase of the subject from pathology to treatment. Of especial interest to us is the part devoted to pathology, which, while not revealing unusual depths of learning, is satisfactory for all practical purposes. The text is interspersed with numerous references to the literature, although the personal note is everywhere dominant. The illustrations are unusually good.

Elements of Active-Principle Therapeutics. By John Marshall French, M.D. Duodecimo; 128 pages. Chicago: The Abbott Press, 1916.

This small book contains a series of lectures on the development of active-principle medication, its principles and the elements of their application. They are written with an elegance of diction and charm of style that are rare in medical literature and, quite aside from that aspect, they are interesting and illuminating.

Books Received

Physics and Chemistry for Nurses. By Amy Elizabeth Pope, Instructor in the School of Nursing, St. Luke's Hospital, San Francisco; author of "Anatomy and Physiology for Nurses," etc. Duodecimo; 441 pages; illustrated. New York and London: G. P. Putnam's Sons, 1916. $1.75.

Collected Papers of The Mayo Clinic, 1915. Edited by Mrs. M. H. Mellish. Volume VII. Octavo; 983 pages; 286 illustrations. Philadelphia and London: W. B. Saunders Co., 1916.

Progress in Surgery

A Résumé of Recent Literature.

The Treatment by Splenectomy of Splenomegaly with Anemia Associated with Syphilis. H. Z. Giffin, Rochester, Minn. *American Journal of Medical Sciences*, July, 1916.

1. It is probable that the syndrome of splenic anemia and Banti's disease may be present in a patient who has had syphilis, in whom it cannot be demonstrated that the syphilis is a definite etiological factor in the condition.

2. Cases of marked splenomegaly in which syphilitic cirrhosis of the liver, or gummata of the liver, are present, or in which repeated positive Wassermann tests together with other evidence of infection are obtained, should be separately classified and studied.

3. Because of the fact that syphilitic splenomegaly with secondary anemia has persisted in spite of active antisyphilitic treatment, splenectomy has been done elsewhere in three recorded cases. Three additional cases of this character are herewith reported.

4. The results following splenectomy for marked splenomegaly associated with syphilis and anemia performed after a trial of antisyphilitic treatment seem to have justified the procedure in these few instances.

5. The three cases herewith recorded showed prompt improvement after splenectomy and were in excellent condition three months, eight months, and one year respectively from the date of operation.

Indications for Splenectomy in Certain Chronic Blood Disorders: The Technic of the Operation. D. C. Balfour, Rochester, Minn. *Journal American Medical Association*, Sept. 9, 1916.

Balfour says that splenectomy has already proved a curative measure in certain diseases associated with definite blood changes and has recently been advocated in other diseases that seem more or less closely related to those in which the spleen is the known causative factor. Splenic anemia affords the most familiar example of its therapeutic value. While the interdependence of the spleen and liver is not clearly understood, there is ample evidence to show that some of the most important functions of the liver are more or less controlled by the spleen, and during the last two years, with this theory as a basis, selected patients with primary hepatic cirrhosis have been splenectomized. Balfour and others have seen good results follow splenectomy in three cases of syphilitic spleen. It may be assumed from the facts that the spleen picks up the spirochetes and harbors them, and its removal, followed by specific treatment, causes prompt and permanent relief. The use of splenectomy in pernicious anemia is on trial and the final decision as to its value cannot be stated. The larger the spleen, it would seem, the better the prospects of good from splenectomy in diseases in which it is indicated. A marked icteric discoloration of the skin in pernicious anemia may be taken as an indication that the spleen is to a large extent responsible. Blood transfusion in small quantities at frequent intervals has been recognized as a valuable treatment, though giving only temporary relief in pernicious anemia. It has recently become evident that it is also of distinct prognostic value. Definite improvement after transfusion is a strong indication for splenectomy, and no improvement, the reverse. At Rochester splenectomy has been found of less technical difficulty in pernicious anemia than in any other disease. An abdominal exploration should first be made after the incision in view of the frequent complications of liver and gallbladder. The dislocation of the spleen is not as a rule complicated by formidable adhesions. In certain cases the tip of the pancreas must be dislodged from its position if the pedicle is to be ligated without injury if it rests in the hilus of the spleen. It is rarely of sufficient size to present difficulties. It is comparatively easy to isolate the arteries and veins and ligate them separately. After all bleeding points have been controlled, the pack is removed and the diaphragmatic surface inspected. They believe that splenectomy should be considered in every case of pernicious anemia with established diagnosis after all possible etiologic factors which might be independently remedied have been excluded. The failure of other means, the previous fatal prognosis, and low operative mortality are strong arguments in favor of splenectomy, and contraindications must be positive and adequate. Granting this, however, our imperfect knowledge makes caution advisable and a conservative selection of cases should be made.

Splenectomy for Hemolytic Jaundice. C. H. Peck, New York *Journal American Medical Association*, Sept. 9, 1916.

The first case, in a young woman 30 years of age, was of the congenital nonfamiliar type and was the first patient in this country on whom splenectomy was performed for hemolytic jaundice. It was first noticed when she was 3 days old and existed in mild degree with no other symptoms until she was about 21, when she first had an attack of deepening of the color. This has been followed by other similar attacks, without other symptoms than a general tendency to intensification. She has never had itching, slowing of the pulse, or any other symptoms of ordinary obstructive jaundice. In 1907, a cholecystostomy was performed in Baltimore, but no gallstones or other lesions were found and the jaundice returned and persisted as soon as the biliary fistula healed. Two and one-half years later she was admitted to the Johns Hopkins Hospital, and a diagnosis of congenital hemolytic jaundice was made by Thayer, who did not advise operation. Her red cell fragility was the same as noted by Peck, three years later. In 1911 she entered a hospital in New York on three separate occasions, but no operation was done. The jaundice so preyed on her mind, however, that she came to the Roosevelt Hospital again in 1912, and an examination was made and a little later an exploratory opertion was done. There were no adhesions and the operation was well borne. Diminution in the jaundice was noted after the third day, and by the tenth day she was entirely free from jaundice for the first time in her life. The striking features of the case were the marked fragility of the red cells and their prompt return to normal after splenectomy, a result which has been by no means uniform in the reported cases. Another was a rather checkered medical experience and the fact that her treatment coincided with the developmental stage of our knowledge of the condition. In the second case the red cell fragility was less marked and it was of the acquired type. Splenomegaly was pronounced, the spleen weighing 800 gm. The jaundice disappeared, as in the other case, after operation, but the fragility remained. The third case mentioned was operated by Dr. J. I. Russell, who permits Peck to include it in his report. The results were equally good, though the patient had been jaundiced since birth. That hemolytic jaundice is not uncommon, and that it can be cured by splenectomy, are facts now well recognized, Peck says, and recent additions to the literature are emphasizing the importance of these facts.

Relief of Chronic Obstructive Jaundice by Palliative Operations. J. F. Erdmann and C. G. Heyd, New York. *American Journal of Medical Sciences*, August, 1916.

Conclusions: 1. All cases of obstructive jaundice are entitled to operative consideration. There is a certain definite percentage of cases that are cured because there has been a mistake in the diagnosis.

2. Operations are not prohibitive considering the severity of the disease and its hopeless outlook.

3. The immediate relief from itching, in addition to the prolongation of life, is an exceptionally strong argument for operation.

4. Operation obviates the development of "pressure pain" from increasing distention of the biliary apparatus.

5. These operations are advised solely as palliative procedures and as such their purpose must be clearly understood.

Some Observations on Congenital and Acquired Hemolytic Icterus: With a Report of Two Cases Treated by Splenectomy. G. E. Brewer, New York. *Medical Record*, July 1, 1916.

After an excellent résumé of this rare condition, Brewer reports two cases in which the jaundice was entirely relieved and the physical condition was considerably improved after splenectomy. He regards early splenectomy as a comparatively safe and the only successful method yet suggested to cure this condition.

The Radical Treatment of Gastric Ulcer. J. Cunning, London. *Lancet*, July 22, 1916.

Cunning is convinced that gastro-jejunostomy is unsatisfactory as a cure for gastric ulcer and may even add to the discomforts of the patient. He holds that all gastric ulcers can be excised except those adherent to important structures, and gastro-jejunostomy is useless for these. In such instances, the stomach can be detached from the base of the ulcer, the opening closed, and the base of the ulcer, after being scraped, is excluded from the stomach.

Observations on the Occurrence of Syphilis in the University of Michigan Obstetric and Gynecologic Clinic. Reuben Peterson, *Surgery, Gynecology and Obstetrics*, September, 1916.

Out of 2,000 patients in the University hospital, excluding the syphilological and neurological services, the proportion of syphilitics was 6 per cent. There were 381 obstetric patients with 18 luetics, or 4.7 per cent.; 390 gynecological cases with 22 luetics, or 5.6 per cent. The diagnosis was made by Wasserman reaction and expert physical examination. Of the 18 obstetric luetics, only 8 gave a history of lues. In these 8 cases there was positive clinical evidence of lues. The possibility of a full-term living healthy child in syphilitic mothers is greatly enhanced by treatment with salvarsan and mercury. The new-born infants of the mothers, so treated, do not give positive Wassermann reactions, although undoubtedly they are syphilitic and later probably will show signs of the disease. A certain proportion of the new-born children of untreated syphilitic mothers will give positive Wassermann tests. Only by routine Wassermann tests will the obstetrician and gynecologist best serve the interests of his patients. Especially is this true in hospital practice, where even careful histories fail to arouse suspicion of latent syphilis.

Epiploitis Following Herniotomy. William Hessert, *Surgery, Gynecology and Obstetrics*, September, 1916.

The majority of cases in which epiploitis follows a herniotomy run a subacute or chronic course lasting for months or even years. The free interval after operation is generally of four to eight weeks' duration, but cases are on record in which two or three years elapsed before the onset of symptoms. Pain is one of the first and most constant symptoms. Frequently it is in the upper part of the abdomen and is aggravated by deep breathing, coughing or tight clothing. Fever may be and usually is associated with the pain, but as a rule subsides with spontaneous recovery. Suppuration occurs in some cases and the epiploitis may then simulate acute lesions referable to abdominal viscera. The slow chronic form of epiploitis may simulate carcinoma and even at laparotomy doubt may be expressed concerning the character of the mass, appearing like a carcinoma or sarcoma. The tumor is usually on the same side as the herniotomy, on a level with or above the umbilicus. It is usually easily palpable, being attached to the abdominal wall and does not move with respiration.

Hessert advises against rough handling of the omentum and of ligation en masse. He prefers to use fine absorbable ligatures for the vessels themselves.

Operative interference is not always necessary, as a fair proportion of cases recovers under expectant treatment. When an exploration is indicated the inflammatory mass should be excised completely. If this is not feasible on account of adhesions and abscess formation, thorough drainage should be established.

Thoracic Diseases: The Status of Surgical Therapy. S. Robinson, Rochester, Minn. *Journal American Medical Association*, Aug. 19, 1916.

Robinson treats the surgery of thoracic diseases, which he considers to be at present in a rather chaotic condition. He says no region in the body demands the combined efforts of the physician and surgeon more than the pleural cavity. Lesions in the thorax are not as amenable to treatment by surgical means as those of the abdomen. It is a more perilous quarter to work in. He advises consultations in cases of postpneumonic abscess so as to aid in determining the point at which spontaneous recovery is doubtful and the operative risk begins to increase. Here the surgeon of the thorax can be of value to his medical brother. In chronic lung abscesses they are less successful, and would welcome the exclusion of this class of cases from the surgical field. They believe that early compression therapy will do great good in chronic abscess cases, and they watch the work of the internist with vaccines, hygienic and climatic influences with great interest. Bronchiectasis would seem to be a chronic, incurable disease, and he ventures to suggest that the practitioner keep such patients as long as possible, but do so intelligently. In true bronchiectasis, expectorants, inhalations, cough mixtures, climatic changes and vaccines fail. Artificial pneumothorax has been reported as curative, but he has grave doubts. Do not invite or permit a surgeon to drain your case of bronchiectasis. It will do no good and possibly much harm. Let no man attempt a lobe excision in a single operation. A single lobe of the lung may be removed in a three or four stage operation which he has described elsewhere, and a small series of cases will be reported within a year. Emphysema is another stumbling block in the chronic, pathologic conditions. The only surgical operation we can offer is the removal of several costal cartilages, which will relieve rigidity but does not cure. Heart and kidney complications and suppurative bronchitis are contraindications. Much reduced expansion is the *sine qua non* of indications. It may be justly said that the methods of exploring the pleural cavity are inadequate, and these as well as other surgical errors should be known, but surgery properly and persistently applied is the best if not the only means of cure. In the management of tuberculosis, the practitioner has ceased to look to the surgeon for help. Drainage of tuberculous cavities is not regarded as a profitable surgical measure. At present the only justifiable mechanical procedure in pulmonary tuberculosis is collapsing the lung by the introduction of nitrogen or fluid into the pleural cavity. This treatment is properly carried on by the internists. Robinson speaks of cold abscesses, which he thinks should be treated as primarily cases of tuberculous pleurisy. The use of the Roentgen ray is advised in swellings on the chest wall, and it can reveal the two types at least that are curable. Removal of malignant tumors, if early localized, is surgically possible, but we cannot expect the internist to diagnose such tumors at their early stage. There is a backwardness, Robinson thinks, in surgeons in utilizing exploratory thoracotomy.

Intradural Nerve Anastomosis in Selected Cases of Poliomyelitis Paralysis: Preliminary Report. Normon Sharpe, New York. *New York Medical Journal*, July 1, 1916.

The experiments of Kilvington, Frazier and Mills and the author have shown that nerve anastomosis within the spinal canal is feasible and successful. Sharpe reports three cases of paralysis of one of the lower extremities due to poliomyelitis in which he performed intradural anastomosis, suturing the dead anterior root to a "live" root. The "live" roots were either the 12th dorsal or first and second lumbar roots which supply muscles of the trunk having other nerve supply. The operations were done in two stages, but Sharpe believes that with improvement in technic the operation could be done in one session. The operations were too recent to permit of definite conclusions being drawn. The subsequent histories will be published later.

Transverse Incisions in the Upper Abdomen. Alexis V. Moschcowitz, New York. *Annals of Surgery*, September, 1916.

Moschcowitz's attention to the value of transverse incisions was called by Sprengel's work, which appeared in the *Archiv f. Klinische Chirurgie*, vol. xcii, p. 537. Moschcowitz points out that the transverse incision is not only more practical but really preferable, since, unlike the vertical incision, it does not divide at right angles a large number of small tendon-like muscle terminations, nor will the wound have a strong tendency to pull apart wider and wider.

In the surgery of the abdominal parietes the transverse incision offers, as against the routine vertical incision, greater ease of execution, as far as "getting in" is concerned, better exposure, more ease of execution, as far as "getting out" is concerned, decided post-operative comfort, better cosmetic results, and no post-operative defects such as hernia.

The Value of the Roentgen Rays in the Diagnosis of Diseases of the Accessory Sinuses, with a New Technic for the Sphenoid. George E. Pfahler, Philadelphia. The *Laryngoscope*, July, 1916.

The Roentgen ray has become almost a routine measure in the diagnosis of accessory sinus disease. Inasmuch as the rays record only the different densities of tissues small sinuses containing relatively little air will give denser shadows than larger ones. The amount of contrast depends upon the health of the surrounding bone. In diseased bone some of the lime salts have been absorbed and the sharp outlines of the sinuses will be blurred.

In the interpretation of the plates it must be remembered that structures behind the sinuses will throw shadows that may obscure the picture and render diagnosis difficult. The author's habit is to make several plates, usually six, especially placed for the different sinuses and by comparison get at his diagnosis.

The new technic for the sphenoid consists in placing films, protected from the wet, in the mouth and passing the rays at such an angle that the picture shows only he alveolar arch and within its curve the sphenoid and posterior ethmoid cells.

In conclusion Pfahler states:

1. By means of the Roentgen rays one may determine accurately the size, outline, form and general character of the accessory sinuses.

2. One can determine the presence or absence of exudate in these sinuses.

3. One cannot determine accurately the character of such exudate.

4. Tumors of the accessory sinuses may be definitely diagnosed, and their extent of distribution determined.

Radium Treatment of Uterine Cancers. Joseph Ransohoff, Cincinnati. *Annals of Surgery*, September, 1916.

The radical removal of the uterus for cancer carries with it so high a mortality that the possible value of radium treatment for this condition deserves further consideration. Dominici's discovery of the usefulness of ultra-penetrating gamma rays opens up a wide field for hopeful study.

Within one to three weeks after radiation no case failed to have arrested its offensive discharge and hemorrhage. Cauliflower vegetations, which often fill the vagina, melted away; the patient's general condition improved amazingly.

The authors radiated 25 cases; of these 11 are still well (3 operable and 8 inoperable cases). They hold that radium is the method of choice in the treatment of inoperable and borderline cases. They emphasize the great importance of not subjecting to hysterectomy cases previously radiated because operation would be difficult and dangerous.

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INSTRUCTION OF MEDICAL STUDENTS AND HOSPITAL INTERNES IN ANESTHESIA.*

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INDIANAPOLIS, INDIANA

Members of the American Association of Anesthetists:—Permit me to express to you my appreciation of the honor you have conferred upon me in electing me your president.

I have selected a subject for my address today which has a bearing upon the position of the professional anesthetist as a specialist and upon the claims of anesthesia to a somewhat important place in the curricula of our medical schools. I fear that in our interest in the purely technical part of anesthesia we are liable to lose sight of the broad general relations of the same to other branches of medical practice and to neglect opportunities to improve the professional position of the specialty. It is to present certain plans and ideas bearing on these matters that I have written this address.

Any art must suffer if it lacks an intelligent and appreciative clientele. By the extent to which anesthesia as a specialty fails to command the support of the medical profession is to be measured the failure of the latter to appreciate the advantages of good anesthesia. Nothing can do more to improve your standing as specialists than to educate physicians generally in this subject, and the best place to begin this course of instruction is with the medical student.

Unless our leading medical schools give instruction in anesthesia not described in their catalogues, the training of students in this subject must be either entirely lacking or very inadequate. Such personal inquiries as I have been able to make of medical teachers convinces me that this is the case.

I am convinced that in most of our medical schools the student receives practically no instruction in anesthesia and that the instruction therein of internes in our hospitals is usually haphazard and frequently resented by its recipients. . Though this indictment may seem severe I believe that it is warranted and that it will be sustained by an investigation of the facts. Such an investigation by this society would be worth while since, by the power of publicity, it might be productive of considerable good. Certainly so essential an art as anesthesia is worthy of more consideration by those who plan our courses of medical instruction, but any one suggesting that more attention be given it would be immediately confronted by many apparently valid objections, of which the most weighty are the following:—

(1) That the medical curriculum is already crowded; (2) that only a few students will ever actually need to know much about the subject, and that these can acquire the necessary knowledge outside the regular course; (3) that most students now take an internship, where they receive ample practice in anesthesia.

Let us consider these in order: (1) It is true that the medical curriculum is at present crowded to the limit and beyond of the student's ability, but this is not because the amount of knowledge necessary for the equipment of a competent practitioner is so prodigious, but because in most cases the curriculum is poorly devised. There is poor corelation of subjects, needless duplication, undue emphasis placed upon unimportant matters, and finally too little provision made for directing the student's private study. To take the example in which we are directly interested, how can adequate instruction in anesthesia be given? The first step is to determine what the student should know about anesthesia. I believe the following ennumeration will strike you as a fair one. He should know, *first*, the physical properties and physiological action of the common anesthetic agents. *Second,* he should be thoroughly familiar with the anatomy and physiology of the organs of circulation and respiration and with the pathological conditions of these organs. *Third*, he should know the effects of hemorrhage, asphyxia, and bodily posture, and the means of curtailing them. *Fourth,* he should know enough about physical diagnosis to enable him to recognize diseases, especially of the heart and lungs, which may make anesthesia dangerous. *Fifth,* he should know as much as possible about the actual conduct of anesthesia.

This array of knowledge looks imposing enough, but you will see that everything named as essential, except the last, has been already learned by the student in his courses in pharmacology, physiology, pathology and internal medicine. All that is necessary to give a satisfactory course in anesthesia is to review these topics briefly, pointing out their relations to practical anesthesia. In meeting the last requirement, my own practice is to have each student conduct from ten to fifteen anesthetics under the direction of a trained Anesthetist, at the Hospital connected with our School. This practice is interesting for the Specialist, is of no harm to the patient, in no way bothers the operator, and certainly benefits the student.

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*President's Address, Fourth Annual Meeting of the American Association of Anesthetists, Detroit, Mich., June 12, 1916.

At this point I wish to digress for a moment to state my opinion that the better part of surgery is after all physiology. I have found that many facts, the understanding of which is vital to any real knowledge of surgery, can be most simply presented by a course in surgical physiology. Likewise the better part of anesthesia is physiology and for this reason I believe that some affiliation of this Society with the Section of Physiology and Pathology of the American Medical Association would be highly beneficial to the progress of anesthesia.

Now for the second objection given above, that not all students require a knowledge of anesthesia:—This is not true. Though the student when graduated, may never himself administer an anesthetic, he will most certainly have patients who will require one, and he cannot properly safeguard their interests if ignorant of the subject. The third objection, that nearly all students after being graduated take an internship in the course of which they acquire a sufficient knowledge of anesthesia, calls for a careful examination. If all students were to take hospital internships, and if the same were in hospitals where the giving of anesthetics is carefully supervised by trained anesthetists, then this objection to the teaching of anesthesia in the Medical School would be partially valid, but I scarcely need to remind you that not all students take internships, and that in comparatively few institutions is there adequate expert supervision of the anesthesia. This leads us to consider just what this supervision should be. I have myself tried out the plan herewith proposed, and have found it a most satisfactory one. It involves the conception that the duties of the anesthetist should not be limited to the actual conduct of the anesthesia, but should cover also the preliminary examination and preparation of the patient and his immediate post operative care..

From a study of deaths or other calamities of anesthesia I am convinced that some system as I have mentioned is far more important than the adoption of any particular form of anesthesia. The plan is as follows: A trained anesthetist is put in charge of the entire matter. It is his duty to see that every patient is properly examined and prepared before operation. The examination includes careful inspection of the nose and throat, careful examination of the heart, lungs and arteries, and at least one urinanlysis. Also the sizing up of the patient generally as an operative risk. After this study the anesthetist advises the operator as to the best form of anesthesia to employ or as to the advisability of giving an anesthetic at all.

Under the supervision of the trained anesthetist are the internes, who each have a definite term of service in this work. They actually make the examinations described and also, under the trained man's direction administer the anesthetic in all ordinary cases. During the operation surgeon and anesthetist work together, so as to spare the patient as much as possible. During and after the operation the anesthetist has charge of the general care of the patient,—the administration of salt solution, external heat, etc. In case of any post-operative complications, as prolonged nausea, pneumonia, or paralysis, the interne anesthetist must make an investigation and report the same in full to the chief anesthetist and to the surgeon. The record of the anesthesia is kept on the same sheet on which are the operative notes.

The advantages of this plan I have found to be many:

(1) It insures adequate examination and preparation for every patient and thus does much to minimize the risks of operation. The dangers are foreseen and for the most part prevented.

(2) It emphasizes the relations of anesthesia to other branches of medicine.

[illegible] res every interne a broad and practical training in anesthesia.

(4) It makes the position of the trained anesthetist one of importance and dignity and gives him the opportunity and encouragement to work for the advancement of his art.

Many of you hold teaching positions in Medical Schools, and nearly all of you have important hospital connections. I therefore hope that the foregoing discussion may have been of interest to you and close with the plea that individually and as a Society you make every effort to secure more adequate instruction in your important. specially to medical students and internes.

HUME-MANSUR BLDG.

SPECIAL EDITORIAL COMMENT.

As a result of the President's address, during the executive session following the Association dinner, a committee composed of Drs. Isabella C. Herb, Walter M. Boothby and F. W. Nagle, was appointed to investigate the teaching of anesthesia in medical schools, and to report on some plan for advancing such teaching and also in establishing some uniform method of training internes in the hospital anesthetic service. At the second annual meeting of the Interstate Association of Anesthetists in Louisville, July 26, this movement was unanimously endorsed and the Association voted to co-operate individually and collectively with the committee of the American Association.

The Program committees for future meetings will also follow Dr. Gatch's suggestion in developing the physio-pathological aspects of anesthesia.—Editor.

TEAM-WORK.*

CHARLES W. MOOTS, M.D.,
TOLEDO, OHIO.

By way of encouragement to your patience, let me advise you at the outset that this paper will not discuss in detail many things that migth be taken up under such a broad subject. The title was rather hurriedly chosen as an excuse under which I might offer to this timely association some practical deductions relative to the important question of anesthesia as viewed from the surgeon's standpoint.

The very first point that I wish to impress upon the members present is this, that the deductions I have to offer are the result of a considerable number of years of careful personal experimentation and study, and that I have no fetich or dogma to support. I am hoping that this experience will prevent me from making many of the foolish statements that I have noticed in our Journals the past few years. For example, I have read articles written by very prominent surgeons in which were found the following conclusions: "Nitrous oxid-oxygen anesthesia should be limited to very short cases"; or "It should be used only in minor surgery"; or "That it cannot be used in major surgery"; or it is "Good for hazardous risks." Five years ago these statements irritated me; today they simply cause me to feel sorry that men whose word carries such great influence will flash before our great profession such false statements relative to such an important subject.

THE PROFESSIONAL ANESTHETIST.

In my judgment, the most important conclusion I have ever reached, especially to my patients, was this, that professional anesthesia is a positive necessity. There are probably others present who will remember the days when the patient was accompanied by their friend and usual medical attendant in order that the anesthetic might be safely administered. The probabilities were that the doctor had given about three or four anesthetics in as many years. This sort of service certainly did not spell *efficiency* or *safety*.

It was about ten years ago that I arranged for the services of Dr. McKesson as anesthetist. The subject was still in its infancy compared to the present time, and the rest of my remarks will simply be a brief recital of our combined efforts during these years.

ETHER AND ITS DISADVANTAGES.

We relied at first almost entirely upon ether as a general anesthetic, as that agent practically settled the question of immediate mortality. There were certain things occurring, however, which we felt should be prevented. We spent much time together in an endeavor to prevent these things. The awful nausea, sometimes lasting for days, seemed unnecessary; the functions of many organs were interfered with, as proven by laboratory findings; delayed deaths occurred, the cause of which we could not conscientiously attribute to the surgical traumatism alone. The symptoms shown in many of these cases are now grouped under the term *acidosis*. We are thoroughly convinced that if many of the cases did not die *of* acidosis, they at least died *with* acidosis, and that one of the etiological factors was the anesthetic. At any rate, since routinely using gas anesthesia and preliminary alkaline treatment, we escape our former mortality and morbidity rate. The remembrance of the nausea and its attending evils often remained for months, causing a bad psychological condition, which grew worse at each and every rehearsal to some new friend or neighbor. All sorts of aids and adjuncts were invoked to prevent these things. These agents included pre- and post-operative remedies and procedures. Improvement in results was not marked.

EARLY EXPERIENCES WITH N_2O-O.

In 1907 we became interested in nitrous oxid-oxygen in a small way. At first our difficulties were many, ignorance of the necessity of joint study and cooperation, poorly devised equipment for administration, and a lack of experience in the signs of this form of anesthesia, being the causes in the light of my present knowledge.

It is true that for two or three years we had some of the troubles commonly attributed to gas anesthesia, but we felt that as the apparatus was improved and our experience broadened, these difficulties could be overcome, and we could offer our patients some decided advantages. Our great difficulty was, of course, due to less relaxation than we had secured under ether, and the necessity of adding ether to the gases too frequently. This problem was not solved in a month, or even a year; but we kept at it, instead of condemning the principle. Today we are happy in the conscious enjoyment of a technic which leaves little to be desired. We have received much aid and encouragement from other clinics, especially from that of our neighbor, Dr. Crile.

In working out the problem of operating any patient without the slightest perceptible shock, and returning them to their usual occupation in the briefest possible period of time, which proposition

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916.

I believe should be our ideal, we marshal our forces to the attack under three periods.

PRE-OPERATIVE, OPERATIVE AND POST-OPERATIVE PERIODS.

The first period comprises the time extending from the first consultation of the surgeon up to the operating period. This period should start out with a pleasant, yet most careful study of the individual. A positive diagnosis should be made wherever possible, as this not only gives the patient needed confidence, but permits the operation to be completed in the briefest possible time. When nothing exists to contraindicate, the operation should be done without any delay, after a decision is once reached that an operative procedure is the one of choice. This minimizes many adverse stimuli coming from well-meaning but ignorant friends. Officials and nurses about the hospital, all are included in the forces which are brought into play to cure the patient, and therefore must understand the importance of proper psychical suggestions. Great thought and care must be given to each individual case, that we may be sure not to view the patients as mechanical devices only, or write orders simply for number so and so.

Preliminary preparation of the patient is of the simplest nature. The body is kept full of fluids, usually alkaline. Complete rest during the night preceding the operation is secured by whatever sedative is considered best for the individual case, which we find generally to be the simplest, namely, sodium bromid. We practically always use some preliminary narcotic, the drug and dosage being considered in each case. If there are no contra-indications, we prefer to start two hours before the operation with an hypodermic injection of some form of opium with scopolamin; this is repeated an hour later. All visitors, including relatives, are excluded from the patient during these two hours. By these means the patient reaches the operating room practically asleep, at least with absolutely no fear, and therefore with an exceedingly high threshold to external as well as internal stimuli.

The second period, which consists of the operation itself, is now started. This period should be completed in the briefest possible space of time compatible with the best work.

One of the great advantages of gas is the fact that if the patient comes to operation with the preparation as described, there is not one unpleasant manifestation while being anesthetized. The majority of our patients are unconscious within thirty seconds after starting them. The field of operation is now blocked off with novocain. There are a few important points I have finally learned that anyone must master before he can enjoy this anesthesia. Among them are these: Don't begin to operate until your anesthetist tells you to. Master the velvet, steady touch, and always with wet gloves when within the abdomen. Anyone who learns to operate easily with gas has acquired a technic that causes much less traumatism than one who cannot so operate. Avoid the use of the extreme Trendelenberg position. Be ready to stop manipulations at any time your anesthetist asks you to—it will probably be for only ten seconds; this really saves time, for he can thereby secure the relaxation you desire, and with much less traumatism than if you continue pulling at the muscles. *Sudden movements of the hands in the abdomen or sudden stretching of the incision causes resistance. Back in our studies of the physiology of the muscle-nerve preparation we observed that the excised frog muscle contracted if stimulated by sudden stretching. The abdominal wall about the incision can ordinarily be lifted three inches above the intestines, so long as the lift is steady, but as soon as the incision is suddenly jerked by the surgeon or assistant, resistance begins and is intensified with each subsequent effort to forcefully overcome the resistance by sudden movements.*

Absorbable suture are used throughout, and we believe it most important to use the smallest size that will withstand the necessary strain, and the kind that will be absorbed just as soon as their function is completed. This factor is especially important in deciding the period of morbidity.

In many cases, and especially of Basedow's goiter, we block off the operated field before leaving, with quinin and urea hydrochlorid.

During the past two years we have added no ether, except upon two occasions, and for the past year not one drop. In fact, we are now using a machine in which there is no provision made at all for any ether.

During these years we have operated with full knowledge of blood pressures in nearly all of the cases. Our experience leads us to the conclusion that nothing very serious happens to a patient on the table without showing circulatory changes. It is considered a part of the anesthetist's duty to keep the surgeon informed of any unsatisfactory change, which is frequently so insiduous in its development that only the sphygmomanometer may detect it with enough accuracy to permit of comparison every few minutes. The systolic pressure is not enough to know; we must have diastolic and pulse-pressure along with pulse-rate and respiratory rate, and volume. The character of the respirations we believe to be of great importance, especially in the very bad risks.

Looking forward to a brief convalescence, we permit no lay friends or relative to be present during the operative period. None of the procedures are therefore rehearsed to the patient. The staff of Flower Hospital recently unanimously voted in favor of a resolution prohibiting the presence of laymen in any part of the surgical department. This is mentioned only in the hope that other hospitals may be inspired to take the advanced step.

We now come to the third or last period, which is so placed on account of sequence and not because it is of least importance. On the contrary, many of the battles are won and lost during this period. The opportunities to secure the desired psychical conditions are greatly increased during this period. However, if the details above described are closely followed, the work during the third period will not be so arduous. There is one fact that stands out prominently, and should be heeded by all surgeons, and this is that no patient is well until she thinks she is well. When one catches this viewpoint, he will be a factor in preventing a large number of chronic incompetents.

The physical after treatment should be of the simplest kind. We give freely of water immediately after the operation. Positions which give the greatest relaxation of muscles about the operated field should be procured unless especially contraindicated. To cure the emotional disturbances, minimize the character of the operation and constantly maintain an extreme optimism. Avoid all bandages and unnecessary appliances in the usual case. Get the patient out of bed early. We get our interval appendectomies out of bed the following day, and permit them to walk about on the third day.

There are many little details that we have omitted, fearing that a recital of complete methods might become tiresome, and can only hope that a general discussion will elicit points that will be of mutual interest. However, before closing I wish to offer these few conclusions that Dr. McKesson and myself feel are now proven and may be used with benefit.

First, nitrous oxid-oxygen as an anesthetic, while extremely dangerous in unskilled hands, is by far the safest anesthetic in skilled hands.

Second. It produces anesthesia without appreciably injuring any cells in the body.

Third. It may be successfully used in all abdominal surgery, and is especially indicated in cases requiring great length of time.

Fourth. The preliminary treatment is of the utmost importance, and should never consist of any atropin, nitrous-oxid itself being a powerful respiratory stimulant.

Fifth. It favors the production of the very best psychical condition of the patient, and therefore predisposes to a higher percentage of permanent cures with shorter periods of morbidity.

Sixth. It favors the growth of professional anesthesia, which is greatly to be desired.

Seventh. While the degree of M. D. carries with it the legal right to administer anesthetics, there is a moral responsibility which requires special training for this work.

Eighth. The surgeon must realize constantly that he is dealing with a living organism and not a mere mechanical device, and that rough traumatic attack will surely be followed by resistance of some sort.

ABSTRACT OF DISCUSSION.

Dr. Walter M. Boothby, Boston: Dr. Moots, in this paper, mentions the postoperative treatment. I wish to say a word regarding this and pneumonia. We have a wide-open pavilion at our hospital. The recovery room was at one time quite cold and draughty, and they had a series of four or five pneumonias following operations. We had had some cases of this kind before that, but I had not had any in my personal cases. The staff attributed this to the kind of anesthesia that I was giving, but it was not due to that at all. It was due to the exposure of patients after the operation that they got pneumonia. Although the nursing was good, it was not good enough. Since then, by keeping the recovery room warm and being sure that the patients were well covered up before being taken back to the wards, we have succeeded in improving matters so that we have had only one case of ether pneumonia this year. In that case, the postoperative treatment was turned over to a nurse whose sole duty it was to see that this was taken care of by the junior nurses; but in this case, the junior house officer, contrary to this nurse's directions, opened the window. I merely mention that to bring out the fact that postoperative care in preventing the patients from getting exposed to draughts will greatly reduce the number of cases of ether pneumonia.

Dr. Herbert: I wish to congratulate Dr. Moots particularly on the point which I thought he would have brought out more strongly, of team work. I have often wished that our surgeons and hospital workers could attend this meeting and listen to the talk of the anesthetists more than they do. I feel that a great deal of our work is wasted, because the men from whom we look for good results do not hear it. Some, of course, read it in the magazines afterwards; but many do not. The importance of the surgeon's help strikes me as of the very greatest moment in methods of anesthesia, and the opinions of different surgeons are bound to be at variance. The agent used is of great importance; and there, again, I think that the surgeons do not help us as much as they might in consulting us about the choice of an anesthetic and the management of the patient before and after, as well as during the operation. It would seem to me that very much too often the anesthetist is considered a necessary part of the operation, and not thought of before or afterwards. How often the anesthetist is blamed for bad results he only knows himself. If I could add anything at all to stimulate our surgeons and hospital workers to assist in this team work, I should like to do so. To that end, I would suggest that if Dr. Moots' views could be spread broadcast in the surgical world, it would do far more good for advancing surgery than all our discussions of scientific anesthesia.

Dr. C. C. McLean, Dayton, O.: I want to add a word of thanks for this excellent paper. With regard to what the gentleman has just said, I was thinking that if this paper had been presented to the surgeons, instead of the anesthetists, we probably would have reaped a greater reward. In giving nitrous oxid as an anesthetic, it is disgusting to have the operator paw around in the intestines as though he were a dog digging; and yet that is what we have to contend with, and then the surgeons will condemn the best method of anesthesia known to the world today. I feel, therefore, that this message of Dr. Moots should be carried to the surgeons in some way or other.

Dr. G. W. Kennedy, Sharon, Pa.: I should like to add my voice to the sentiments expressed by Dr. Moots. The time is not so long since the anesthetist bore the same importance to the surgeon that the printer's devil bears to the editor of a paper. He was more or less of a necessity for the time being. We find now, however, that people are now asking, "Who is going to anesthetize me?" as well as "Who is going to operate on me?" I was particularly struck with this paper in regard to team work. I have been trying to secure team work in our own town. I think that this paper should be brought to the attention of the surgeons who are operating. We should get it into the hands of as many surgeons as possible.

Dr. A. M. Caine, New Orleans: I should like to know what percentage of vomiting there was in the cases of Dr. Moots.

Dr. Moots (closing): I should like to assure you all that I am carrying the "*message to Garcia*" as fast as I can, in all the societies that I am a member of.

In regard to what Dr. Kennedy said, I think that the question is how to reach the surgeon. It is certainly discouraging. In connection with nitrous oxid gas, the surgeons are still talking of the things I have mentioned to you. It is aggravating; and the only thing you can say is that it is better not to know so much than to know so much that is not so. I believe that the men who have had a broad training are going to get into the spirit of not having a method that they are going to defend, but that they will be open to suggestions coming from meetings like this.

In reply to Dr. Caine with regard to vomiting, our cases during the last year ran less than four per cent.; and of that percentage, the majority had but slight vomiting on the table, and none afterwards at all. In fact, it is a peculiar thing that the patient who has a little vomiting immediately after the cessation of the operation is not nauseated again.

ETHER-OIL COLONIC ANESTHESIA.*

WALTER LATHROP, M. D.
HAZLETON, PENNSYLVANIA.

In presenting this subject before an assemblage composed largely of expert anesthestists, there is no attempt made to hand out material that is not familiar to a good many present, but the main idea is to place before you our experience from the standpoint of the operator, with this method of inducing anesthesia.

Dr. James T. Gwathmey, of New York City, must be given full credit in bringing forward this procedure, and to his patiently working out various methods, and discarding combinations that were not proper, we owe today whatever there may be of value in it. Cunningham of Boston first used air as a means of conveying ether vapor into the intestinal tract, and the work of Sutton and Cunningham was of help to the originator of the present scheme of ether-oil.

PHYSIOLOGICAL EFFECT.

Soon after the first administration of the mixture, the psysiological effects are shown, when it becomes warmed to bodily temperature, and at this point the ether becomes gas (or some of it does), and is rapidly absorbed by the capillaries of the colon, and carried to the general circulation, is taken through the lungs, where some is excreted, and some reabsorbed, and carried to the brain. In our experience there has been little or no change in blood pressure. The brain does not seem to be deeply narcotized as in the inhalation method, and the patient usually regains consciousness rapidly, after the bowel is washed out, as will be mentioned later.

The eye reflex is seldom lost, while relaxation of the general muscular system is usually complete. The four factors acting in harmony which help to maintain an even anesthesia are the following:—

1. The constant rate of evaporation of the ether from the oil.

2. The distention of the colon, causing less ether to be absorbed than when partially distended.

3. As the ether leaves the oil, both mixture and gut are cooled, and this retards elimination and absorption.

4. The difference between the absorptive power of the colon and the eliminative capacity of the lungs. (Gwathmey.)

INDICATIONS AND COMPLICATIONS.

Where fear is a prominent element as in goitre operations, and especially the toxic cases; in neurotics; in patients with asthma, particularly those cases we see so often in miners, where the breathing is very difficult, ether-oil is the method of choice. I have seen these individuals sleep calmly under colonic anesthesia, with none of the cyanosis, and choking in the inhalation method. It is useful in those patients who have short, thick necks, and narrow air passages, and it is valuable in all operations upon the head and neck. It is *contra-indicated* in *rectal disease of any kind*, or when *pain is caused by its introduction*. We have had but one case of looseness of the bowels following this method.

In our experience the postoperative effects have been excellent, in fact better than with the routine methods of ether or chloroform, and vomiting has been much less frequent than after inhalation. The patient on awakening is usually comfortable, aside from the throat irritation often following thyroidectomy. They can retain nourishment, or medication in most instances, while after abdominal operations there is much less pain for some time, even though consciousness has been regained.

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916 From the Surgical Department of the State Hospital, Hazelton, Pa.

TECHNIC.

In our own work, the method of administration, as followed now, after various experiments, consists first of administering a laxative the night before operation, followed by an enema of suds the next morning. The lower bowel should be empty; a special rectal tube one-quarter inch in diameter with eye in the side should be used, and a clamp for the tube should be provided, also a small funnel into which the mixture is poured. Gwathmey has designed a special tube for this work. Children under twelve years need no preliminary treatment aside from the enema. The patient should be preferably in the Sims position.

The mixture used by us for the preliminary injection consists of:—

Paraldehyde, two to four drams,
Ether, one-half ounce,
Olive Oil, one-half ounce.

This is slowly injected into the rectum, forty minutes before the time set for operation. Twenty-five minutes after this mixture is given, a quarter grain of morphia is administered *hypodermically*. After forty minutes from the first injection, or more if necessary, the final mixture, consisting usually of:—

Ether, three ounces,
Olive Oil, two ounces,

thoroughly mixed in a bottle, is given slowly, about *one ounce per minute,* and by the time all has been introduced the patient should be asleep. Several folds of gauze should be placed over the face, and the anesthetist should watch the case as in any other method. In some instances, a damp towel over the face will deepen the anesthesia, where the gauze will lessen it. Occasionally a little ether will be needed by inhalation to induce perfect narcosis, but this is not the rule. *Experience is the great factor;* and in our earlier work we used four, and five ounces of ether-oil, where now we rarely exceed three; and in stout patients three and a half to four ounces. *It is important that the use of this mixture be in the hands of one who can begin its administration and have it under his or her care in all cases, and not be delegated to a different doctor or nurse each time it is given.*

REACTIONS UNDER ANETHESIA.

The breathing is usually quiet and regular; pulse normal and reflexes not disturbed. Should there be cyanosis, stertor or marked loss or reflex, it is an indication to withdraw one or two ounces of the mixture from the colon. The rectal tube is always left in the bowel, and clamped. Should respiratory arrest occur, of course the treatment would be the same as in any case under inhalation anesthesia, plus the emptying of the intestine. After the operation is completed, or better, while the sutures are being introduced, the rectum should be thoroughly irrigated with tap water, and gentle massage of the colon from right to left will help expel any mixture remaining. After irrigating the bowel, we inject a pint of tap water and four ounces of olive oil.

We have tried a variation of the preliminary injection, as recommended by Gwathmey. This consists of:—

Morphia, one-fourth grain,
Bromide of Potash, two drams,
Paraldehyde, two drams,
Water, q. s. ad., four ounces.

This is given one hour before operation, and followed at the regular time by the ether-oil mixture. We have not followed this as a routine, but depend altogether on the mixture and method already mentioned. The amount of ether-oil has been reduced at least one-third since this procedure. A six-ounce mixture, four of ether and two of oil, will maintain splendid anesthesia for more than an hour, or long enough for any ordinary major operation, while usually in goitre work, we rarely use more than three ounces of ether. For children, equal parts of ether-oil should be used, and as a rule two ounces will do the work.

UTILITY.

In bringing this subject before this association, I am not endeavoring to give anything new, as Dr. Gwathmey has already done much missionary work; but to emphasize my belief in its great value in special cases, and particularly *Thyroidectomy,* where freedom of movement is essential, and the ether cone an absent member. Any one who has had experience with hyperthyroid conditions, with the associated apprehension, nervous tension, and tachycardia, can appreciate the great satsifaction of being able to anesthetize patients in bed, practically without their knowledge, and complete an operation, with no added element of fear. Also its value must be admitted in those conditions where the toxic element is not yet present, but the border line is about reached. As far as calmness and indifference is concerned, the principle of anoci association is realized, while the technic of Crile can be easily carried out if desired, and is of great value in many cases. In the high strung, nervous patients it is our practice to give every day or every other day, an injection of four ounces of water, with instructions to retain it for the tonic effect. The morning of operation the patient is given the regular dose of paraldehyde etc., and later on the regular mixture.

after which the operation is performed. Some patients require the whole mixture while in bed, and others can be moved to the operating room, and the remainder of the mixture given there.

ADVANTAGES.

The apparatus is cheap, and the technic so simple that the anesthetist can give his, or her, whole time to the patient. Anesthesia is under control and the mixture can be withdrawn if needed. There is absence of mucous and saliva in nearly all cases, and the ether is less irritating to the Colonic membrane than the vapor is to that of the respiratory tract.

Gas pains are reduced to a minimum. The safety limit is extended owing to the gradual absorption of ether by the colon, and its rapid elimination from the lungs. Very soon after giving the preliminary dose, the odor of paraldehyde is noticed on the breath, showing the quick elimination of the drug. It is of interest to note that the experiments of Dr. W. H. Park of New York City showed that an ether-oil mixture of seventy-five per cent. killed the colon bacillus in one minute, thus giving another factor of safety, against possible infection. We do not advocate this method for general use, as time would not permit of this procedure, where there are a good many operations to be done, and we use ether chiefly, but do from one to four operations under colon anesthesia each week.

From an experience with several hundred goitres, under inhalation anesthesia, and nearly *two hundred under the ether-oil colonic method,* it is our firm belief that this latter is supreme over any other procedure with which we are familiar, though I am willing to concede a great deal to the perfected method of oxygen and nitrous oxid. However, as proved by Dr. Gwathmey, we have in the colonic method a margin of safety between the dosage required for surgical narcosis, and that causing toxemia,—"*after administering the ether-oil, it is impossible at any time to withdraw the oil and leave the ether, or vice versa. Every molecule of ether is bound to one of oil, and this union is broken only when vaporization occurs.*"

Anesthesia, when established, is maintained automatically by the ether separating from the oil by well known physical laws, and this vaporization never varies, so it is impossible to have deep anesthesia at one time, and a light one at another, unless deepened by rebreathing, or lightened by an airway tube. (Gwathmey.)

Baskerville of the College of the City of New York by his studies and experiments in the laboratory, has shown that the evaporation of the ether is very constant, no matter whether cotton seed oil, lanolin, codliver, or olive oil is used, and he has had some interesting charts made to illustrate this work. The cases now recorded are well up toward two thousand, scattered over the whole country. We have thus far used the ether-oil method in 256 cases, of which 171 were for goitre or hyperthyroidism, and 85 were abdominal operations, such as hysterectomy, gall bladder affections, hernias, appendectomies, and bone grafting, the latter cases being very satisfactory, owing to the patient keeping much more quiet after operation, and allowing the plaster paris to set properly.

To demonstrate that we are conservative in our use of this method, I would state that in the past 22 months, we have administered anesthetics in 3,307 cases, of which 256 were by the *ether-oil method.* However, we have used it much oftener during the past 8 months, and will doubtless add largely to our statistics from now on.

CASES OPERATED UPON UNDER ETHER-OIL ANESTHESIA.

Goitres:—	
Hyperthyroidism (Two Deaths)	24
Parenchymatous	61
Colloid and Cystic	86
	171
Abdominal sections	85
Total	256

CONCLUSION.

In conclusion I would say that in our experience with the ether-oil:—

1. It is most valuable in head and neck operations.
2. It is valuable where bronchial affections would render the inhalation of ether irritating and dangerous.
3. There is little or no fear as seen in other methods.
4. There is less tax on the kidneys and the lungs.
5. Operations can be done with very little knowledge of its procedure on the part of the patient, which is valuable in certain conditions where fear and apprehension add to the danger in the case, and at the same time Criles nerve blocking can be easily carried out and give added safety to the operation.

ABSTRACT OF DISCUSSION.

DR. J. J. KING, New York City: I wish to congratulate Dr. Lathrop on the excellent results he has had in his goiter cases. I have seen him operate by this method on five or six patients, at different times, and they slept quietly and peacefully, and were perfectly anesthetized. I wish to report a case that I had last summer: a boy, seven years old, who had very large, septic tonsils and adenoids. He had been a *blue baby* with a patent foramen ovale. He was sent to me for a tonsilectomy, and I found that it was necessary for his welfare that his tonsils and adenoids should be removed. I asked Dr. Gwathmey if he could give the anesthetic. The normal color of this patient at the time was a purple cherry-color. Dr. Gwathmey thought that he could with safety use ether-oil by rectum. We sent the boy to the hospital, not telling him that he was going to have an operation. An enema was given him each morning for a week before the operation; and on the morning of the operation, he received an enema of the ether-oil mixture, instead of the kind he had been having. He was thus anesthetized and was then carried to the operating room, where I removed his tonsils and adenoids; and it was done safely. The nurse, who had been with him a great deal during his life, said that his color during the operation was not very different from what it was ordinarily, especially when nervous or excited. He was still anesthetized when taken back to his room in the hospital. After recovery he told his mother that he had been asleep and had had a nose-bleed, not knowing that an operation had been performed on his throat.

Dr. C. J. Peck, New York City: I should like to endorse everything that Dr. Lathrop has said. I have had some experience in this work for two years, and have operated on a number of cases anesthetized in this way and have found the method very satisfactory. I think that Dr. Gwathmey is too modest in his attitude on this, and I shall be disappointed if he does not publish something on the subject pretty soon.

My last experience with this method of anesthesia was in a breast case in a patient who was very nervous and dreaded the anesthetic more than anything else. It was given in bed; and she went off to sleep, and did not know that she was getting an anesthetic. The operation was long and tedious, and she came out of the anesthetic without vomiting. She had no trouble, except that she felt some soreness. For a long time, we were unable to convince her that the operation had been done. If any of you have no use for this form of anesthesia in selected cases, I think that you should study the subject; because you will be convinced of its usefulness. Of course, there are contraindications for its use. In abdominal work, the presence of the dilated colon may give trouble. It will be coming into operative area. In rectal cases, the use of this method is contraindicated also. In breast cases, however, and in operations on the neck and face, it is the ideal anesthetic.

Dr. Lathrop (closing): I have very little to add, except that last week I had ten thyroidectomies for hyperthyroid conditions. These all had anoci preliminary treatment, as detailed by Dr. Crile. They knew nothing of the anesthesia or operation and woke up in bed; and made uneventful recoveries. I believe that in selected cases this method of anesthesia has a useful field. In cases of sarcoma of the jaw or cancer of the tongue, it is absolutely ideal and, in my opinion, absolutely safe. Experience is, of course, a great teacher; and after once having used it in selected cases and seen its effect, the surgeon will not only like this method, but, I think, demand it in many instances. I feel that it is due to the profession that Dr. Gwathmey should publish the accumulated experiences with this method.*

SPECIAL EDITORIAL COMMENT.

**In The American Year-Book of Anesthesia and Analgesia, recently issued by the Surgery Publishing Co., New York City, Dr. Gwathmey presents an exhaustive paper on Ether-Oil Colonic Anesthesia, detailing not only the historical and experimental evolution of the method, but also its histo-pathology, technic, utility for certain procedures and the accumulated experience of those who are using it as a routine.*

As this method of anesthesia promises to become one of the most valuable routine technics for special operative procedures, it will be invaluable for the specialist in anesthesia to base his knowledge on the experience of those who have made it a success.—Editor.

VAPOR ANESTHESIA FOR INTRAORAL SURGERY.*

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Indianapolis, Indiana.

The first vapor inhaler was constructed by Junker in 1867 and was intended for the administration of chloroform vapor. This apparatus consisted of a hand bulb, bottle and delivery tube, and was almost indispensable in many operations upon the head. Hewitt states that on more than one occasion the rubber tubing has been connected wrong, and as a result liquid chloroform has squirted out through the delivery tube, and since one or two fatalities had thus arisen he had deemed it wise to modify the inhaler. Braun further modified the original Junker inhaler so chloroform or ether, or a combined vapor could be obtained, attempting to heat the vapor by passing it through hot water. Ether was fast coming to the front at the time as a safer anesthetic than chloroform. As the ether vapor came more in demand there were different types of apparatus constructed to deliver it. Gwathmey used a three bottle device, by which a moist ether or chloroform, or a combined vapor could be given. Gatch at Johns Hopkins used an apparatus in which the ether vapor was passed through twenty-five feet of copper tubing surrounded by hot water. He could regulate the dropping of the ether by a needle valve. Brophy used two bottles, one of which contained ether, the other was used simply as a trap by some anesthetists and by others as a container for hot water. There are many other types, more or less familiar, probably giving satisfactory service to at least their originators. One of the greatest difficulties encountered was to construct an apparatus that would not freeze easily, causing delay with the anesthetic and annoyance to the anesthetist.

In the preparation of ether vapor for inhalation there has been ample opportunities for the anesthetists, surgeons and instrument makers to test their ingenuity and mechanical ability to perfect suitable devices. And since, there are now so many different types on the market, with new ones frequently being described which are simple and complicated in mechanism, large and small in size, moderate and expensive in price; I have come to the conclusion that we will soon have as many different types of vaporizers, as we have different kinds of knives for dissecting the tonsil. Each apparatus may prove amply efficient in the hands of its originator, but it is a difficult proposition to have something of this kind that will give perfect satisfaction when turned over to other people and taken care of by non-interested persons around the hospital.

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*Read during the Organization Meeting of the Inter-State Association of Anesthetists, Cincinnati, O., May 4, 5, 1915.

During the past few years there has been a marked improvement in the administration of ether vapor whereever it was indicated, and numerous experiments have been carried out towards placing it on a scientific basis. Dresser placed accurate mixtures of ether and air in rubber bags and this mixture was inhaled by a number of men. "All agreed that 8 per cent. ether vapor was irrespirable, that 9 per cent. caused contraction of the glottis, that 7 per cent. caused irritation and cough, that 6 per cent. was usually respirable." Dresser concluded that a "person in a conscious state should not inhale ether vapor exceeding 7 per cent." Karl Connell developed accurate percentages of ether required for surgical anesthesia given by the vapor method either endopharyngeally or endotracheally. In the beginning 30 to 45 per cent. by weight of ether is required in air, after five minutes it falls, reaching 26 per cent. for the tenth minute when relaxation is established. From now on the percentage goes downward finally reaching about 15 per cent., which of course falls still lower as recovery approaches.

Some anesthestists and operators hold that there is no need to heat the vapor in any form, that by the time it has reached the distal end of the tube the temperature has been sufficiently raised to answer all purposes—that is, it is around room temperature. Such is the case, for by the time the vapor reaches the end of a 3½-foot tube, after passing through a second bottle or a series of coils, the temperature elevation has occurred. In fact, I have found it usually registers by the thermometer within two to four degrees of room temperature. Even with the bottle containing the ether surrounded by ice cold water, the temperature at the distal end of the rubber delivery tube is seldom less than ten degrees F. below room register, while the temperature at the proximal end will be around 45 degrees F. Of course, these readings would vary somewhat, I used a foot bellows to supply the air and passed a constant stream of bubbles through the ether, quite sufficient to freeze ice on the outside of the ether bottle. However, when ether vapor at room temperature strikes the throat of an individual, unless they are completely under by some preliminary method there will be coughing, holding of breath with some cyanosis and usually excessive secretion of mucous. Ether vapor given at room temperature to children upon whom the tonsil and adenoid operation is to be performed, usually causes these irritating symptoms to some degree; no doubt part of it is due to the irritating effects of the vapor itself, and the fact that children of this type are nearly always poor breathers makes it more difficult. It has not been my privilege to see the vapor given by the Alexander-Gwathmey method, where catheters are passed through the nose and the vapor given below the soft palate and the obstructing portion of the tongue. In 1913 at St. Bartholomew's clinic Alexander and Gwathmey were using the oil of orange ether anesthesia; no vapor was given, for as a rule the operative procedures were completed without applying the mask again.

Lately warm ether vapor for intraoral operations has been coming more to the front, to be used after the patient is partially or completely under, and to carry on the anesthesia after it is necessary to dispense with the mask. There are many advocates for the use of warm ether vapor. Both Beck of Chicago and Cain of New Orleans have completed motor driven devices for the giving of warmed ether vapor. Beck's has been used in cleft palate and tonsil work in my own city, the resulting vapor anesthesia was excellent. Caine's was used by Dr. Clyde Lynch while he removed a papilloma of the larynx under Suspension Laryngoscopy at the joint clinical meeting of the American Laryngological, Rhinological and Otological Society held in Cincinnati recently. The warm vapor gave perfect results while the operation was in progress.

Personally warm ether vapor has always appealed to me, that is, vapor brought up above room temperature by some heating device.

1. The vapor itself seems less irritating than the cold, which may be due to lack of concentration.

2. The mucous membranes of the throat are soon accustomed to the warm vapor, so deep inhalations can be taken without discomfort.

3. As a rule there is more rapid recovery and less ether *hang-over*.

4. It does not produce the excessive flow of mucous.

5. A certain amount of the penetrating odor of ether is eliminated, a benefit to both the surgeon and anesthetist.

Failure to find a small device which could easily be taken to the home or from one hospital to another caused me to do some experimenting with the following points in mind:

1. To construct, if possible, an apparatus that would positively elevate the temperature of a mix-

ture of air and ether vapor to at least 98 degrees F. at the end of the delivery tube.

2. To avoid freezing in the air tube immersed in the ether, also in the exit tube.

The vapor was heated by passing it through a series of coils around an electric lamp. This worked fairly well for myself, but I was very careful to keep the shutters partly open, so too much heat was avoided. Also I was careful to see that a continuous flow of air was kept up with the foot bellows. Both Drs. Chas. Cabalzer and A. F. Guedel had trouble while using it with the formation of aldehydes.

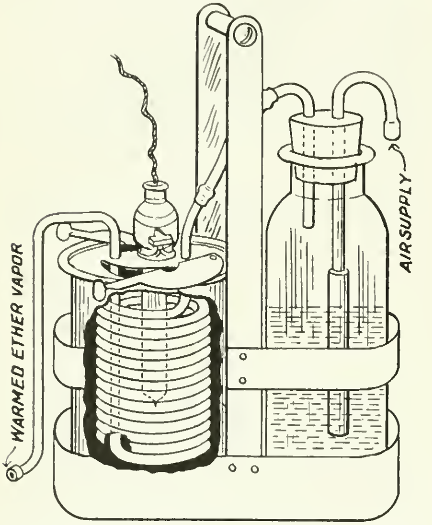

Fig. 1. Author's experimental apparatus, showing carrying device in which the vapor apparatus is handled. The air supply (preferably constant) enters the ether container as indicated, produces the vapor, which is carried through the coil, heated by an electric lamp, and issues from the tube attached to the hose connected with the nasal tubes or mouth gag. Part of the metal side wall of the heating unit has been removed to show the lamp and coil arrangement.

If the electric lamp was allowed to heat the coils sufficiently to produce a mixture of air and ether vapor which would register around 95 degrees F. at the end of the delivery tube a constant stream of air was required; otherwise there would be foreign odors present, the chief of which was aldehyde. Should the air supply be stopped after it had been in use for a short time, the vapors in the heated coils would undergo decomposition and aldehydes could easily be detected when the vapor again came out of the tubing; after the flow had continued a short time, the warm vapor, practically free from foreign ordors would result. Aldehydes will form even at ordinary temperatures in ether when exposed to air and light, and if ether vapor is allowed to stand in heated coils the formation takes place very quickly, rendering the resulting vapor unsafe for administration. Consequently, the apparatus was discarded as far as the heating was concerned. A foot bellows did not supply the air evenly enough to prevent some decomposition of the ether vapor while in the heated coils.

R. M. Isham and C. E. Vail in an article on the oxidation of ether (Journal American Chemical Society, April, 1915) report several facts of interest. They state that the literature on this subject seems to be somewhat incomplete. I found the only reference that would be of much interest to anesthetists would be that of Löw, who has shown that ether vapor, when mixed with air and passed over a heated superficially oxidized copper spiral, is oxidized to aldehyde. Their attention was first directed to the subject when a strong odor of acetaldehyde was noted issuing from a Freas electric oven, in which the residues from the ether extraction of some wheat samples were being dried at a temperature of 110 degrees C. Several experiments were carried out by them to determine the extent of oxidation of ether. They found following two experiments that the oxidation was 2.9 per cent., but more oxygen would be required to secure complete oxidation. When, however, they attempted to use a larger proportion of oxygen with the initial temperature as low as 150 degrees C. the reaction was so rapid that the gas mixture was subject to sudden rises in temperature and subsequent explosions. Consequently they had to abandon the attempt. They have come to the following conclusions:—

"1. That ether vapor is oxidized to aldehyde and acetic acid when heated with air or oxygen.

"2. This oxidation begins at temperatures as low as 110 degrees C. and is very rapid at 160 degrees C."

It is probable that some of the ether vapor would be oxidized at a lower temperature than 110 degrees C., for at that temperature the odor of aldehyde was easily detected.

Therefore, if we expect to have pure ether vapor warmed up to at least 95 degrees F. at the end of the delivery tube, there must be a constant stream of air or air and oxygen supplied, which can best be done with a motor or supply tank, each equipped with a regulating valve. However, the question arises, is it worth while to heat the vapor to this extent? The excessive heating could be somewhat avoided, if one could construct an insulated delivery tube, avoiding the rapid cooling of the vapors. Some of the present warming devices do not deliver the vapor to the patient over 3 to 5 degrees above room temperature. The vapor is warmed in the heater, but loses most of the heat while passing through the delivery tube.

Another point of interest is the collecting of frost on the outside of the ether bottle when in use for some time, the ether itself is cold and does not vaporize readily. To the best of my knowledge Beck has been the first to overcome this difficulty, which he has accomplished by the use of a low heating hot plate. The ether bottle sets in a container, with one inch of warm water in it. The heat generated is not sufficient to boil the water at any time, but ample to prevent the formation of frost.

In conclusion, in my opinion the newer motor driven devices are most excellent and should be in hospitals where operative work demands the use of vapor anesthesia. Up to the present I have not seen a portable device which can easily be taken from one place to another but what gives more or less trouble when in use for any length of time. My own experients have taught me to watch closely for aldehydes, also some means should be taken to prevent frost from collecting on the ether bottle. These two facts will undoubtedly play an important role in future development of vapor anesthesia, and apparatus for its administration.

Pennway Building.

ANESTHESIA IN EPILEPSY.*

W. H. Mytinger, A.B., M.D.,
Cincinnati, O.

By the term epilepsy as it is used in my title, I limit myself to the so-called cases of *idiopathic* epilepsy and shall have nothing to do with the *symptomatic* type. This group of patients, formerly little understood, has recently been brought under a scientific classification through the original work of Dr. Charles A. L. Reed of Cincinnati. A definite and constant pathology has been determined and a bacillus has been isolated which is in all probability rightly regarded as specific.

The data for my paper has been gathered from a series of one hundred cases of epilepsy and fifty cases of visceroptosis in which I have administered anesthesia during the past six months. Had the period of time been one of years instead of months, the excuse for this paper would probably not have arisen for it has been the constant recurrence of certain phenomena day after day which has enabled me to draw certain conclusions.

Just as in his every day life the epileptic presents marked clinical peculiarities, so also in his anesthetic existence do we encounter deviations from the average clinical type. The convulsive seizure so essentially bound up with the disease itself is almost constantly to be dealt with in a more or less modified form and presents the chief difficulty to be overcome.

Habitual constipation due to the pronounced visceroptosis which is constantly present is the rule. This leads to a sluggish circulation and to a reduced power of oxygenation.

An extreme acidosis is present, probably of infectious origin and heightened by the appearance of the epileptic attack. The salivary secretion turns blue litmus red and even after prolonged alkalinization this reaction remains unchanged.

The convulsive seizures under anesthesia show a wide range of variability both as to their nature and as to their number and also as to their time of occurrence and their duration. Profuse salivary and mucous secretion characterize the attack. The swallowing and laryngeal reflexes are excessively active and peculiar throaty sounds are heard which one feels at a loss to describe. The eyes may deviate and lateral nystagymus is often present. The pupils as a rule are contracted and equal, although occasionally one pupil is contracted and the other dilated, while only rarely does one see both pupils dilated which I believe is the rule when the attack ordinarily occurs. The lid reflexes become very active and are entirely independent of external stimuli. The facial muscles may all be involved in this muscular excitation.

The jaws may be firmly locked together and may be fixed over the tip of an enormously hypertrophied tongue which presents excoriations and scars from previous seizures. At other times there is a convulsive grinding of the teeth. At times the tongue muscles are involved and when this organ is hypertrophied and forcibly drawn backwards the act of respiration is almost at a standstill.

Cyanosis of an extreme degree develops rapidly, giving the appearance of impending death for lack of oxygen and which passes rapidly with the lessening in intensity of the attack. The respirations are usually of the stertorous type and are embarrassed to a greater or less degree. Both the rate and the depth of respiration are subject to great variability.

Occasionally the epileptic cry is heard. This occurs as a rule during induction, but on two occasions was distinctly audible during the stage of maintenance. During the induction with the onset of a seizure the skeletal muscles may be involved. Those of the back of the neck, the upper and the lower extremities being frequently affected. At times these muscular spasms occur during the stage of maintenance. They may be either clonic or tonic in type, the former type predominating.

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* Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916

The pulse rate and pulse volume are peculiarly independent of the paroxysms. When one sees a deeply cyanotic patient, struggling for breath, he is surprised to find a heart attending to business just as though nothing were going on which concerned it. A rise in rate is noted but not commensurate with the respiratory embarrassment and readily explained on the basis of muscular activity.

As to the number and time of occurrence of the seizures we find a wide range of variation. On two occasions they were absent entirely. Usually at least one seizure occurs during the induction. This may end the attacks for a given case or there may be a series of attacks of longer or shorter duration extending throughout the entire course of the anesthetic. At times there may be an almost continuous chain of seizures with their varying manifestations. It is not an uncommon thing to see the surgeon working in a perfectly relaxed abdomen with the patient blinking his eyes, breathing spasmodically and at times shaking the table with tonic convulsions of the skeletal muscles.

As regards the pathological findings visceroptosis of a high degree is constantly present. This is accompanied by a marked relaxation of the muscles of the jaw, tongue and upper respiratory tract. This relaxation is not comparable to the relaxation encountered in the anesthetic state with the ordinary case. It is so extreme that, in the writer's opinion, it is pathological. This phenomenon has been so constant in all of these cases of epilepsy and also in a series of visceroptosis cases uncomplicated by epilepsy, that the writer is led to venture the opinion that the ptosis is not confined to the abdomen, but that all the ligaments of the body are probably involved. Indeed, on several occasions where this degree of relaxation was encountered and the diagnosis of visceroptosis had not been made prior to operation, I have ventured the diagnosis when the patient was put on the table and it has been verified on abdominal section. The value of this observation is that, given a known case of visceroptosis to anesthetize, we can anticipate a mechanical interference with respiration. The truth of the observation I leave to the test of time.

As regards the anesthetic management of these cases they are uniformly difficult subjects to handle. Prolonged preoperative treatment preferably in a sanatarium or in the home where the atmosphere is conducive of mental quiet and physical rest is desirable. Any influence tending towards excitement of any kind should be done away with.

Intravenous alkaline and dehydration medication should be resorted to combat the existing acidosis over a period of ten days to two weeks before the operation. At the same time bromides or other sedatives should be freely resorted to and frequent courses of vigorous catharsis including high enemata should be employed. At times even after the most careful and persistent efforts to cleanse the intestinal tract on examining the colon at operation it is found practically loaded with hard scyballous masses. An hypodermic of from 1/6 to 1/4 gr. morphin sulphate with 1/150 gr. atropin sulphate has been used in adult cases as a routine. It is of value in combatting the excessive secretion and allaying the severity of the convulsive seizures. Due to the sluggish circulation the absorption seems delayed and the best results have been obtained when given about one hour and fifteen minutes prior to operation.

As to the anesthetic agent to be employed I shall not attempt to lay down any rules. I shall merely give my own procedure and the reasons why I have adopted it.

With the existing high degree of acidosis present nitrous oxid-oxygen would seem to be the anesthetic of choice. However, due to the sluggish circulation, these patients oxygenate poorly. It is exceedingly difficult to maintain abdominal relaxation, so important in these cases, by means of gas-oxygen even when accessory nerve blocking is employed. As a consequence, in order to maintain proper surgical anesthesia and to control the convulsive seizure, one must resort freely to the use of the ether attachment so that the advantages to be derived from this method do not seem to the writer to offset its disadvantages, the least of which is the much greater cost to the patient.

Most of the standard authorities advise the use of chloroform in patients of this class. Chloroform by inhalation is an old remedy for so-called uncontrollable convulsions. Having seen convulsive seizures appear during the stage of maintenance with ether narcosis, I believe that the pushing of chloroform to the point of abolishing the convulsive attack would be dangerous in the extreme.

I have then resorted to the use of ether in these cases using the nitrous oxid-ether sequence with the Bennett inhaler supplementing with oxygen when indicated. A reasonably smooth anesthesia is obtained and there is no inconvenience to the operator. The induction period is prolonged, due in all probability to the sluggish circulation to the resultant delayed absorption and often to the necessity of waiting for a convulsive seizure to subside before taking the patient into the operating room.

With the onset of an attack during induction a high degree of cyanosis may rapidly develop and it is often necessary to apply the tongue clamp and resort to the use of the pharyngeal tube. In some instances strong support of the jaw will suffice in maintaining an open airway. Throughout the stage of maintenance one must be constantly on the watch for the appearance of convulsive manifestations. The after care of these patients presents no particular difficulty other than the maintenance of an open airway and the nurse should always be instructed to support the jaw until the patient is pretty well out of his anesthetic.

After having administered anesthesia to a number of these patients one gets the impression that he gives a double anesthetic, one to the patient and one to the disease itself for, after the induction has proceeded quietly almost to the stage of narcotization, a convulsive seizure appears and it seems that one begins all over again.

In conclusion, I wish to emphasize the fact that these cases are not choice ones, from an aesthetic standpoint, on which to display your anesthetic prowess. The uninitiated will blame the anesthetist for the epileptic manifestations whatever they may be, even though these are entirely outside of his control. However, one who handles these cases can at least have the satisfaction of work well done for he alone knows and appreciates the difficulties which he has had to surmount.

5 GARFIELD PLACE.

ABSTRACT OF DISCUSSION.

DR. GEORGE W. CRILE, Cleveland, O.—I should like to ask Dr. Mytinger how often, in his series of cases, he has observed covulsions during the induction of anesthesia or its maintenance?

DR. W. H. MYTINGER.—Epileptiform seizure are almost the rule during the induction stage of anesthesia. I have less frequently noted the attacks during the maintenance of narcosis.

DR. F. H. MCMECHAN, Cincinntai, O.—It is interesting to consider whether the method of anesthesia can be made to control the incidence of epileptiform seizures during narcosis. Dr. Cole of Birmingham, Ala., has recently reported a typical seizure of petit mal in an epileptic patient whom he was operating on. It occurred just after the bone flap had been elevated during a decompression under local anesthesia. This would indicate that local or reginal anesthesia is no propylactic measure.

Several years ago during a meeting of the Ohio State Medical Association at Cedar Point I had an opportunity of discussing this subject with one of the women physicians of the Hospital for Epileptics at Gallapolis. She had anesthetized a large number of epileptics for operative procedures in no way associated with their systemic ailment. She had used the open-drop-method of etherization in all her cases; and in practically every instance, she assured me, that either a petit or grand mal occurred during the induction stage of anesthesia, necessitating, as Dr. Mytinger has said, a practical re-induction of narcosis. In a personal communication, a Dr. Green of Georgia, who is in charge of one of the largest hospitals for the epileptic and insane in that state, also corroborated the interesting, clinical points in the behavior of epileptics under anesthesia, which Dr. Mytinger has brought to our attention.

DR. W. H. MYTINGER (closing)—I have nothing further to add, except to mention one point of interest in view of Dr. Meltzer's Observations on the Inhibitory Properties of the Magnesium Salts. Some of the patients in this series of cases received infusions of magnesium sulphate intravenously, but it seemed to have little or no effect in obviating the incidence of the epileptiform seizures. The convulsions occurred just the same. Dr. Cole's case quoted by Dr. McMechan, was probably of the symptomatic type, for which decompression is done; all of the cases in my series were of the idiopathic variety.

SOME BODILY CHANGES DURING ANESTHESIA.*

FRANK C. MANN, M. D.
ROCHESTER, MINNESOTA.

In studying the bodily changes due to an anesthetic or occurring during the anesthetized state, it is necessary to differentiate carefully the effect of associated conditions. The preliminary excitement, struggling, asphyxia and other accompanying phenomena produce changes quite apart from the anesthetic itself. The compensating physiologic mechanism necessary in light anesthesia is probably not the same as when a deep anesthetized state is produced. A short or long period of anesthesia may differ only in degree, provided the anesthetic tension remains the same.

The present investigation deals mainly with a study of the blood of dogs under ether anesthesia. While the associated conditions, as asphyxia, etc., were also included in the study, in general only the results obtained while the animal was under surgical anesthesia will be emphasized..

The blood is the carrier of the anesthetic substance in every method of general anesthesia, and it is important to know definitely how it is affected by each anesthetic either directly or indirectly. This knowledge is of especial value in view of the fact that today more patients than ever before are being operated on under general anesthesia who have a lower hemoglobin content and more pathologic changes of other kinds.

While in the experiments herein reported the methods of etherizing differed, depending on the condition desired, the general procedure consisted in a preliminary etherization in a closed cabinet until the animal was completely relaxed, followed by the employment of the auto-inhalation method.[1] The latter consists in intubating in the same manner as for intratracheal insufflation. The intubation tube is connected through a valve tube with a double perforated ether can, which allows of a limited amount of rebreathing. With little effort, constant anesthesia can be maintained in this manner for long periods. .

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916. From the Laboratory of Physiology, Mayo Clinic, Rochester, Minnesota.

It was important to determine first whether the amount of circulating blood was diminished. This was estimated according to a method described in a previous publication,[2] which consisted in bleeding the animal from the femoral artery and from the right heart and then comparing the amount of blood obtained with the total amount present in the body, estimated on the basis of 77 per cent. of the body weight. While this method gives only comparative results, it is accurrate enough, when carefully controlled, to show gross changes. In a series of six normal animals which were bled immediately after being etherized, I was able to obtain an average of 76 per cent. of the estimated amount of blood. In a series of six animals which were bled after from six to nine hours of light etherization, only 64 per cent. of the estimated amount of blood was obtained. The decrease in the amount of circulatory fluid would probably have been much greater if deep anesthesia had been employed. The result is due undoubtedly to loss of muscle tone and venous stagnation, as explained by Gatch.[3]

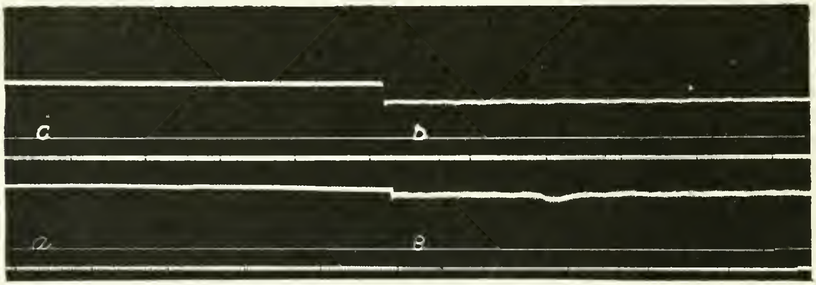

Figure 1. Tracing showing changes in blood pressure under ether. *A* is the record of blood-pressure immediately after etherization; *B* in three hours; *C* in six hours and *D* in nine hours after etherization. During this time the pressure decreased from 105 to 60.

The lipoids of the tissues seem to have the greatest affinity for the most common anesthetic substance. Of these lipoids, lecithin and cholesterin are the most important. The dissolving power of ether and chloroform for these two lipoids has formed the basis for the best known theory of anesthesia. As it has been shown that lecithin is greatly increased in the blood during anesthesia,[4] it was desirable to know whether the cholesterin content of the blood also underwent changes. Accordingly, determinations of the cholesterin value of the blood were made in one series of experiments. The method employed was that described by Bloor.[5] The cholesterin was estimated just before anesthesia, immediately after a stage of prolonged excitement and then at different intervals after etherization. In active dogs the cholesterin content of the blood does not seem to undergo any great changes during a period of time equal to that for which our dogs were kept under anesthesia. In the anesthetized dogs it was found to change considerably, but the variations were not uniform enough to permit definite conclusions. In general, it seems that the cholesterin value increases during excitement, decreases below normal after an hour or so of anesthesia, and then gradually increases above normal on further etherization (Experiment 62).

Previous investigation has shown that the viscosity and specific gravity of the blood remain the same under light anesthesia, but both increase when the animal is deeply anesthetized.[6] In several of these experiments the specific gravity was estimated by both the Hamerschlag and the Roy Jones methods, and the foregoing results were corroborated. Under light ether anesthesia the specific gravity of the blood does not change even though the etherization is maintained for as long a period as ten hours. However, when the animal is deeply etherized and respiration becomes shallow, the specific gravity increases a few points in the fourth decimal, probably because of the asphyxia.

As ether and chloroform lake the blood, it has been thought that these anesthetics might have a deleterious effect on the red cells and hemoglobin. This possibility was tested in several experiments. A blood count and hemoglobin estimation were made before anesthesia and at different intervals after etherization. The ordinary hemocytometer and a Dare hemoglobinometer were used. As a rule, neither the hemoglobin nor the number of red cells underwent changes greater than the coefficient of error, even after ten hours' etherization. In some of the experiments there was an increase in both, but it was slight. In a few experiments the resistance of the red cells before and after etherization was determined by the fragility test of Ribierre.[7] No change in the resistance of the erythrocytes or hyposmotic salt solution was noted.

Leukocytosis occurs in a dog under ether anesthesia, provided the anesthetic is maintained long enough. Occasionally the white cells increase in number within the first hour of anesthesia, but frequently not until after four hours. The increase may be very slight, in some animals not above the coefficient of error, but usually by the end of the fourth hour of anesthesia the number of white cells has doubled. The leukocytosis is not always progressive. Frequently a maximum number is reached which more prolonged etherization does not change. Sometimes there has been a decrease before the end of anesthesia. Usually, however, the number of white cells does not begin to decrease for a few hours after the animal has recovered from the anesthetic, and is still above normal twenty-four hours after etherization (Table 1).

The leukocytosis just described is practically a constant and general phenomenon. It is not limited to the peripheral circulation, for the white counts are usually the same in the blood from ear veins, femoral veins and mesenteric veins (Experiments 54 and 80). This fact, that the white cells are increased in the blood in widely separated parts of the body, also eliminated the possibility that stagnation to dependent parts or reaction to external irritation were factors. Such leukocytosis occurs in animals in which a moderate leukocytosis is present already (Experiment 91). It resembles a leukocytosis of digestion. All of our experiments, however, were performed on dogs that had not had food from twelve to twenty-four hours. It differs from the leukocytosis produced by drugs, such as pilocarpin, in the fact that it is not a lymphocytosis and atropin does not prevent its occurrence (Experiment 77).

The spleen is not an important factor in its production, for it occurs also in animals that have been splenectomized. Its cause and site of action have not been definitely determined, but it would appear that it is a direct stimulation of the bone marrow.

Differential counts of the blood before and after ether show that there may be an actual increase in all of the forms of white cells, but that the polymorphonuclear cells are usually the only form showing also a relative decrease of polymorphonuclear cells noted. The large lymphocytes usually decrease relatively, while the small lymphocytes always decrease. The transitional cells usually show an increase. In one experiment the eosinophils increased greatly. The size and character of all the cells remain normal (Table 2).

TABLE 1.—CHANGES IN THE NUMBER OF WHITE BLOOD CELLS UNDER ETHER AT DIFFERENT HOURS AFTER ANESTHESIA.

No. of Exp.	Normal Count	First Half Hour	First Hour	Second Hour	Third Hour	Fourth Hour	Fifth Hour	Sixth Hour	Seventh Hour	Eighth Hour	Ninth Hour
51	.....	18,400	.....	.....	19,100	.....	.....	27,200	.....	.....	39,300
52	.....	10,920	.....	.....	14,470	.....	.....	14,520	.....	.....	15,400
53	.....	15,960	.....	.....	13,420	.....	.....	18,340	.....	.....	18,870
54	.....	13,200	.....	.....	14,400	.....	.....	29,900	.....	.....	29,900
60	7,000	.....	8,100	.....	.....	.....	15,000	15,800			
61	10,400	18,400	.....	20,250	.....	.....	39,900				
69	12,150	13,700	.....	.....	.....	.....	24,000	.....	.....	19,000	
70	21,450	25,000	.....	.....	.....	.....	.....	32,750			
71	20,600	.....	.....	.....	.....	23,450					
72	33,850	44,550	.....	.....	.....	.....	.....	.....	50,450		
73	19,800	.....	.....	.....	.....	.....	39,400	.....	46,100		
74	13,300	13,950	.....	.....	.....	36,400	.....	.....	51,300		
75a	20,000	24,800	.....	30,750	35,000	.....	.....	28,330			
75b	8,000	.....	10,000	14,000	17,000	23,830	25,230	25,000	27,000	29,000	
76	14,900	18,700	20,000	26,900	27,900	67,920	29,300	30,000			
77	18,050	.....	18,450	20,000	24,800	28,650	30,500	.....	35,800		
78	21,450	.....	33,650	35,400	44,100	45,000	45,000	.....	.....	40,000	
79	14,000	.....	17,750	21,650	23,850	25,000	21,180	23,050			
81	12,000	18,000	19,250	18,000	21,650	23,300	.....	24,580			
82	26,000	.....	.....	.....	35,000	.....	.....	39,000			
83	25,000	.....	.....	.....	30,000						
85	18,500	.....	.....	.....	20,100	.....	.....	.....	.....	27,100	
86	12,000	.....	.....	.....	.....	.....	19,452				
87	17,000	.....	.....	.....	.....	.....	19,000				
88	16,100	.....	.....	.....	.....	.....	25,400				
89	15,100	.....	.....	.....	30,500	.....	.....	47,450			
90	11,800	.....	.....	.....	.....	.....	19,000				
91	21,000	.....	.....	.....	.....	.....	.....	40,100			

TABLE 2.—CHANGES OCCURRING IN THE DIFFERENTIAL BLOOD COUNT BEFORE AND AFTER LONG PERIODS OF ANESTHESIA

Cells	Experiment 75		Experiment 76		Experiment 77		Experiment 79		Experiment 81		Experiment 89	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Polymorphonuclears	64	86	76	81	78	89	66	86	79	90	76	93
Large lymphocytes	13	5	9	6	6	3	6	6	6	5	10	3
Small lymphocytes	17	2	10	7	7	2	20	2	7	0	5	1
Transitionals	3	6	5	6	6	5	1	3	2	3	4	2
Eosinophils	3	1	0	0	3	1	7	3	6	2	5	1

Studies on phagocytosis have demonstrated that the phagocyte reacts to anesthetics in a manner similar to other unicellular organisms. Fat-dissolving substances, such as ether and chloroform, in weak solutions, stimulate phagocytic activity until a certain optimum strength of solution is reached. Any increase in the amount of anesthetic substance above this produces a decrease in phagocytosis and finally a paralysis of the cells.[8]

In previous studies, the white cells have usually been subjected to artificial environment. They were separated from the blood, suspended in salt solution and, after the addition of the substance with which they were to be tested, such as carbon particles, were incubated for definite periods of time.

It was deemed of value to determine whether phagocytic activity was altered when the cells were subjected to concentration of the ether such as occurs in the blood under surgical anesthesia. In order to make conditions as nearly normal as possible, the following method was employed: Under local anesthesia one of the jugular veins was exposed, dissected entirely free from surrounding fascia and doubly ligated, a section about 10 cm. long being left between ligatures partially distended with blood. A suspension of *Bacillus coli* in salt solution was injected into this natural incubation tube, and after it was thoroughly mixed by rolling gently between the fingers, the skin was closed over the vessel. Under these conditions the blood does not coagulate, the phagocyte remains in its normal medium at approximately its normal temperature, and has access to the bacteria in approximately the natural way. After various intervals of time, an hour being found the most suitable, smears were made. These slides were used as controls. After definite intervals of etherization, the process was repeated on the other jugular vein with exactly the same technic. The cells in the latter vein had been subjected for several hours to a concentration of ether strong enough to maintain the animal under surgical anesthesia.

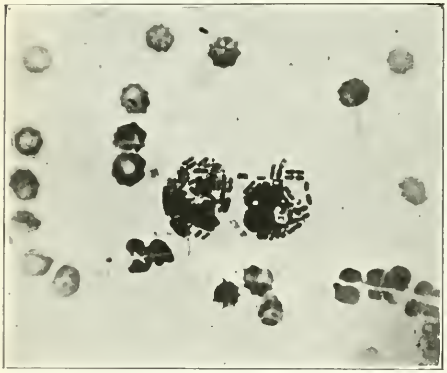

Figure 2. Photomicrograph showing two phagocytes filled with bacteria. These cells had been subjected to five and a half hours of etherization before given access to the bacteria.

The blood smears were stained, and a count of the phagocytes containing bacteria and the phagocytes without bacteria was made. Usually 200 white cells were counted on a slide, and frequently counts were made on several slides from one vein. The average was taken as the final result. Only the polymorphonuclear cells were included in this count. The occasional large lymphocyte or eosinophil containing bacteria was ignored. It is obvious that there are chances for error in the method, but I do not believe the average error exceeds 10 per cent.

TABLE 3.—PHAGOCYTOSIS BEFORE AND AFTER ETHERIZATION.

Exp. No.	Normal Count W. B. C.	Count of W. B. C. at Time Bacteria Were Injected After Etherization	Percentage of Cells of Normal Blood Containing Bacteria	Percentage of Cells of Etherized Blood Containing Bacteria	Number of Hours Etherized
87	17,000	19,000	73.5	87	5
88	16,100	25,400	21	36.5	5
89	15,100	47,450	45.5	57.5	5½
90	11,800	19,000	50	50	5
91	21,000	40,100	90	90	6

The results show that phagocytes which have been subjected for from four to six hours to a concentration of ether which is capable of maintaining a dog under surgical anesthesia do not exhibit any marked changes in activity. In most of these experiments the greater number of cells containing bacteria was found in the blood subjected to the ether, but the increase was not sufficient to be of positive significance. It can be definitely stated, however, that there was no decrease in the phagocytic power of the cells in the blood subjected to etherization (Table 3 and illustration).

TABLE 4—FINDINGS IN EXPERIMENT 54.

	Red Blood Cells	White Blood Cells	Specific Gravity	Hemoglobin	Blood Pressure
Blood taken from peripheral veins:					
Immediately after etherization	5,775,000	13,000	41	70	105
Three hours after etherization	5,437,000	14,400	41	..	80
Six hours after etherization	5,675,000	29,900	41	..	75
Nine hours after etherization	6,020,000	29,900	42	71	60
Blood taken from portal circulation:					
Nine hours after etherization	6,050,000	25,700	42	72	..

SUMMARY.

A study of the blood of dogs subjected to etherization demonstrated the following facts: The amount of circulatory blood is diminished about 10 per cent. after six to nine hours of light etherization. There are variations in the cholesterin values, but the changes are not uniform. The specific gravity does not change under light etherization, and under deep anesthesia increases only as asphyxia becomes a factor. The number of red corpuscles, the amount of hemoglobin, and the fragility of the red cells do not change. There is always a leukocytosis in ether anesthesia. The degree of leukocytosis varies from a very slight increase in the number of cells to more than double the normal number. The increase is usually present after from three to four hours of etherization, and is due mainly to cells of the polymorphonuclear form. The leukocytosis is not dependent on the spleen and is not prevented by atropin. It is probably the result of a direct action on the bone marrow. Phagocytic action is certainly not depressed by an etherization period of from five to six hours.

The following experiments are presented as typical of the series they represent:

Experiment 54.—July 27, 1915, a young adult female terrier, weighing 5 kg., at 7:55 a. m. was etherized and blood data were taken immediately. The apparatus was arranged to record the carotid blood pressure.

Experiment 62.—Feb. 19, 1916, female bull terrier in excellent health; weight 17.6 kg.

8:20 a. m.: Blood withdrawn from left jugular vein for cholesterin estimation. Animal very quiet. Cholesterin value, 0.266.

8:21 a. m.: Animal placed in etherizing cabinet and etherized very slowly.

8:50 a. m.: Animal intubated.

8:52 a. m.: Blood withdrawn; cholesterin value 0.312. Animal kept under surgical anesthesia.

9:55 a. m.: Blood withdrawn. Cholesterin value, 0.180. Animal maintained under anesthesia until 3 p. m., when, after another test was taken, it was allowed to recover.

3 p. m.: Blood withdrawn, cholesterin value, 0.358.

Experiment 77.—April 1, 1916, male mongrel; animal very quiet; weight 15.1 kg.

8 a.m.: Animal was given 1/9 grain morphin and 1/100 grain atropin subcutaneously.

8:30 a. m.: Count of white blood cells was taken.

8:45 a. m.: Etherized quickly by Cone method. Animal maintained under surgical anesthesia until 4 p. m., when it was allowed to recover.

The counts of white blood cells were as follows:

8:30 a. m.,	18,050
10:00 a. m.,	18,450
11:00 a. m.,	20,000
12:00 m.	24,800
1:00 p. m.,	28,650
2:00 p. m.,	30,500
4:00 p. m.,	35,800

Experiment 89.—May 3, 1916, adult mongrel, male; weight 9 kg.

8:15 a. m.: Count of white blood cells taken from right ear vein and smears for differential count. Right jugular vein exposed under local anesthesia. Doubly ligated vein leaving it almost filled with blood. Length of vein, 8 cm. Total white cells, 15,100. Differential count: polymorphonuclears, 76; large lymphocytes, 10; small lymphocytes, 5; transitionals, 4; eosinophils, 5.

8:30 a. m.: Injected 1 c.c. suspension of *Bacillus coli* into vein. Vein markedly distended. Gently mixed by compression.

9:00 a. m.: Animal etherized.

9:30 a. m.: Smears taken from right jugular vein showed that 45.5 per cent. of the phagocytes contained bacteria and 54.5 per cent. did not contain bacteria.

11:30 a. m.: Took count of white blood cells from right ear vein; count 30,500.

2:25 p. m.: Took count of white blood cells and smears for differential count from abdominal vein. Total count of white cells from abdominal vein, 47,430. Differential count: polymorphonuclears, 93; large lymphocytes, 3; small lymphocytes, 1; transitionals, 2; eosinophils, 1.

2:30 p. m.: Exposed and ligated left jugular vein. Injected 1 c.c. of same suspension of *Bacillus coli*. Technic same as used on right vein.

3 p. m.: Count of white blood cells from mesenteric vein, 46,650.

3:30 p. m.: Smears made from blood of left jugular vein showed that 57.5 per cent. of the phagocytes contained bacteria and 42.5 per cent. did not.

Experiment 91.—May 11, 1916, young male, mongrel; had had distemper for about four days; weight 8.5 kg.

8:20 a. m.: Exposed left jugular vein.

8:44 a. m.: White blood cells, 21,000.

8:45 a. m.: Injected suspension *Bacillus coli* into ligated vein.

9:00 a. m.: Animal under ether.

9:45 a. m.: Made smears from left vein. Of the phagocytes 90 per cent. contained bacteria.

Animal maintained under surgical anesthesia.

3:00 p. m.: Exposed right jugular vein and injected bacteria.

3:02 p. m.: Count of white blood cells, 40,100.

4:00 p. m.: Made smears from right vein. Ninety per cent. of the phagocytes contained bacteria.

Mayo Clinic, Rochester, Minn.

ABSTRACT OF DISCUSSION.

Dr. Isabella C. Herb, Chicago: This is one of the papers of the scientific session that should not be passed by without appreciation, if not discussion. I am pleased to note the tendency to present the more ultra-scientific phases of anesthesia at our meetings, and this is an indication of progress in the right direction. The clinical phrases of the art of anesthesia should not engross all our time; rather, from now on, the theory of anesthesia should be investigated. We are still inclined to place too much value on mere clinical observation without checking up our opinions with laboratory research.

While the question of blood changes under ether has been previously considered, the subject has been by no means exhausted, and what Dr. Mann has presented as his experimental data is well worth mature consideration. It is time that the effects of asphyxia or cyanosis (the concomitants of some methods of etherization) should be dissociated from the real physio-pathology of etherization induced and maintained with proper regard to the thorough oxygenation of the patient under operation.

Some years ago Hamilton Fish pointed out the hazard which anemia projected into the safe conduct of anesthesia, and his conclusion that any general anesthetic is contraindicated if the hemoglobin content is below 50 per cent., is fraught with significance. His contention that the leucocytosis of anesthesia is phagocytic in character is corroborated by Dr. Mann's researches and the photomicrographs he has presented.

Perhaps one of the most important prophylactic measures in the control of shock is the clinical application of the experimental researches of Drs. Gatch and Mann in the preservation of muscle tone to prevent splanchnic stasis.

Also many of Dr Gatch's contentions about the advantages of light anesthesia are corroborated by these researches into the alterations in the specific gravity and viscosity of the blood, during deep anesthesia and especially when the factors of cyanosis or asphyxia intervene.

The general leucocytosis found during etherization in

Dr. Mann's experiments has been detailed by Chadbourne, emphasized by DaCosta and Kalteyer and corroborated by Casto, who is also of the opinion that it is a result of a direct action on the bone marrow.

If my recollection serves me, all previous investigators rather inclined to the opinion that etherization had more or less of an effect upon the number of red corpuscles, especially the erythrocytes; that the hemoglobin content was altered and that the return to normal was more or less delayed according to the length and depth of anesthesia. It may be that the asphyxial factor entered prominently into these previous investigations; although Casto in experimenting on the human subject and rats under nitrous oxid-oxygen anesthesia has found these changes more or less pronounced.

Recently Mendenhall has been working on the coaglation time of the blood under anesthesia and Crile and Menten have been determining the H-ion content. The sum total of these researches will give us a more thorough understanding of why the preconceived notion that etherization destroyed immunity has abruptly become an open question, especially in view of its therapeutic use in acute infections.

Dr. Mann is to be congratulated on being among those who are rewriting the physio-pathology of anesthesia.

I should like to ask Dr. Mann whether the specific gravity of the blood was lowered when a great deal of oxygen was given with the anesthetic and also whether a closed method of etherization was used in the experiments?

Dr. F. W. Nagle, Montreal, Canada: I want to ask Dr. Mann whether I understood him correctly to say that there was no leucocytosis or hemolysis in the first hour of etherization. If I remember correctly Hamburger and Ewing found considerable hemolysis, even after only one hour of ether administration.

Dr. Walter M. Boothby, Boston, Mass.: At the meeting of the Pharmacological Society last winter and also the year before, I strongly urged that in experimental work dealing with etherization the dosometric method of administration should be employed. Apparatus is available for this purpose. If Dr. Mann could state what anesthetic tension his animals had been under and for how long, his results would be comparable with others for future reference and experimentation. Such work as his is too painstaking not to have the slight additional expense of an accurate dosimetric method of administration. Even if not used in the clinic it should always be used in experimental work.

Dr. F. C. Mann (closing): In answer to Dr. Herb's question I would say that when anesthesia was light with no asphyxia, there were no changes in the specific gravity of the blood. Dr. Nagle understood me correctly; I did not find hemolysis. The method of anesthesia used was the auto-inhalation method devised by McGrath. While dosimetric methods may be ultra-scientific, in these experiments an effort was made to approximate the method of etherization to that usually employed in anesthetizing patients in surgical clinics. Dosimetry would certainly add a valuable control to the experimental results.

Whatever differences there may be in the results of these researches and those of previous investigators, are due, probably, to some extent, to the fact that our experiments were conducted under an improved method of etherization. The physio-pathology of anesthesia offers many interesting phases for research and we hope to continue our experiments along lines that will make their results applicable to the improvement of anesthetic methods and surgical procedure.

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SPECIAL EDITORIAL COMMENT.

The subject of Blood Changes under Anesthesia and Analgesia has been exhaustively dealt with by Theodore D. Casto in an article in the American Year-Book of Anesthesia and Analgesia. All previous investigations of importance have been reviewed and Casto's own researches and those of Mendenhall, Menten and Crile incorporated. Also the Year-Book contains papers by F. C. Mann on the Peripheral Origin of Shock and by W. D. Gatch on Circulatory Disturbances due to Laparotomy, Posture and Anesthesia. These papers give the reader an insight into the mechanism of diminished blood-flow, splanchnic stasis and the role of light surgical anesthesia in preserving intra-abdominal pressure and the proper degree of muscle tone.—Editor.

CHLOROFORM-ETHER SEQUENCE WITH A SUMMARY OF RESULTS TO DATE.*

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The subject of surgical anesthesia is far from being a closed chapter. In eighty-five per cent. of all operative procedures, the anesthesia is the most serious feature and often the life of the patient rests with the anesthetists, a fact which is not generally appreciated. Improvements in surgery are not all confined to the development of operative technic. The experienced operators today take into consideration not only the gravity of the operation but also the immediate and remote effects of the anesthetic, and for this reason he is associating in his team-work an expert anesthetist, from whom he demands the qualifications of a specialist. The surgeon is not alone in this reform; the public is also demanding better service in anesthesia, and that is the reason why the status of the anesthetist is gradually, however slowly, assuming the importance and dignity it deserves. If the anesthetist wishes to render his position secure he must study and put into routine practice the most improved methods of anesthesia available for cooperating with his surgical confreres and for satisfying the public and holding its confidence.

The past has presented us with over five hundred substances, combinations and mixtures for general, local and anociated anesthesia (Gwathmey). I mention this to show that up to the present even routine methods of anesthesia have not been entirely satisfactory. Of all these agents for anesthesia, only a few have achieved any standing during the past seventy years, and of these ether and chloroform have been the most frequently used in general surgery.

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916.

One of the greatest changes in the Middle West during the past decade has been the comparative passing of chloroform from routine use and the substitution of ether. The bugbears of etherization—pneumonia and nephritis—have been lived down. There have been so many mishaps from the use of chloroform, so many near-deaths, actual fatalities and post-anesthetic toxemias, that its use has been gradually abandoned. While certain dangers always present in the use of chloroform, they have been exaggerated on account of the lack of instruction in medical schools on the art of anesthesia and the proper administration of anesthetics. Authoritative literature on the subject was also lacking. Nearly all works on surgery and therapeutics ignored the subject, treated it slightingly or simply compiled all the fallacies from the time of Sir James Y. Simpson, interspersed with a few truths.

The past few years have witnessed a great change, however. Noted surgeons, chemists, physiologists, anesthetists and dentists have studied anesthesia in all its phases and have finally placed its theory and practice on a scientific basis of laboratory research and clinical corroboration. And the end is not yet. These researches and their clinical application are being enthusiastically continued.

Some of the methods developed in these investigations can only be acquired and used by the most expert and at the expenditure of considerable cost for the equipment. While undoubtedly alluring to all, they cannot be used routinely by the average physician who is called upon frequently to administer anesthesia for operations in his immediate community. Among the methods available for this purpose is the chloroform-ether sequence by the drop method, which has stood me in good stead, and to some details of which I wish to call your attention.

TECHNIC OF THE CHLOROFORM-ETHER SEQUENCE.

In the preliminary administration of chloroform in this sequence, chloroform is dropped upon an Esmarch, Yankauer or similar mask, until the patient is anesthetized to the stage of unconsciousness. The reflexes are now in abeyance. The change to ether is made abruptly. A modified Allis inhaler is used. This modification consists in stringing copper wires across the interior of the mask to support the gauze, instead of weaving the gauze on the old-style inner frame. The amount of gauze should be equivalent to nine or ten thicknesses of loose-mesh surgical gauze, and should be laid in lightly, but blosely around the edge of the inhaler so as to catch every drop of ether.

Ether is dropped, slowly or faster, as the exigencies of the anesthesia or the operative trauma require. During the transition the ether must be dropped rather briskly until a surgical plane of narcosis is reached; otherwise the patient may show signs of coming out. Properly administered by a steady, continuous dropping of the ether, the gauze will not become too saturated and interfere with the proper volatization of the anesthetic. The continuous administration, regulating the rapidity of the ether dropping, will enable the anesthetist to hold the patient in any desired plane of anesthesia.

Perspiration and the accumulation of mucous are both signs of too concentrated a vapor. The face should be kept dry and the mouth cleansed of mucous with a gauze swab, or by turning the head to the side to let the secretions flow out of the angle of the mouth. It should be the constant effort of the anesthetist to keep the patient's color as pink as possible, as this is an indication that while the concentration of the anesthetic vapor is sufficient for surgical narcosis, it is not sufficient to prevent the proper and necessary oxygenation of the blood and tissues.

ATTITUDE TOWARD THE PATIENT.

Successful anesthesia depends in large measure upon the attitude of the anesthetist toward the patient, which should be sincere and gentle, however firm. Mystery is disconcerting to all patients, so it is the better part of discretion to inform them why such details as covering the eyes are done. If told what their sensations will be while going under and how to facilitate the onset of unconsciousness by proper breathing, they will be handled all the more readily. There is no reason why the patient should not be anesthetized on the operating table. While some may object, through fear or ignorance, the majority will readily consent after a proper explanation. Except for being placed in the posture required by the operative procedure, patients should not be moved during the induction or maintenance of anesthesia, as such movement may cause nausea and vomiting; may alter the plane of narcosis and necessitate a prolonged induction or reestablishment of the proper depth of anesthesia, at the expenditure of a larger amount of the anesthetic and to the detriment of the uneventful recovery of the patient.

I may seem prolix in emphasizing the advantages of strict attention to details, but I know from experience that this painstaking care not only goes a long way in determining the smoothness of the anesthesia, but also does much to gain the patient's confidence.

RESULTS.

I have anesthetized twenty-four hundred patients with the chloroform-ether sequence. Of the last two hundred cases I have kept a complete record.

One of the greatest annoyances to both patient and anesthetist is post-anesthetic or post-operative nausea and vomiting. While occasionally this complication may be due to acidosis, peritonitis, gallbladder infections and operative trauma, in a certain definite percentage of cases it is due to preliminary morphinization or the anesthetic. Of the two hundred cases recorded, sixty-one or about 30 per cent. were nauseated or vomited. A few vomited during the induction of anesthesia; the remaining on returning to consciousness or soon after their return to bed. In six instances the vomiting was severe, interfering with the administration of the anesthetic or continuing from six to twenty-four hours after the patient's return to bed. The incidence of nausea and vomiting in the twenty-four hundred cases was considerably higher than the percentage in the recorded cases.

AMOUNT OF ANESTHETICS.

The amount of chloroform necessary during induction is rather uniform, being from one to two drams, or on an average one and a half drams to secure the stage of unconsciousness. In eight cases of the series it was necessary to return to chloroform after attempting the transition to ether, but in these instances all the cases were alcoholics. The chloroform was dropped into the Allis inhaler, from fifteen to twenty minims being used.

The amount of ether required varied with the types, mentality and physical condition of the patients. Some exhibited decided idiosyncrasies, and for these the variations in amount were extreme. A difference in the amount used also varied with the products of the different manufacturers. The average amount of ether used during the first hour was four ounces, and a less quantity for each succeeding hour.

COMPLICATIONS.

There was one case of post-operative pneumonia in the series of recorded cases. A woman, aged 30, who had been operated on for hernia and appendectomy. She recovered.

Suppression of urine occurred in a woman aged 40, who was operated on for strangulated hernia in the presence of a chronic nephritis. She took the chloroform shabbily, but the ether very well. She recovered from the anesthesia without nausea, but complete suppression of urine set in the second day after operation and the patient only lived five days.

ADVANTAGES.

I do not claim that the chloroform-ether sequence is the best method of anesthesia, but merely that it is one of the best. In certain cases I administer chloroform and ether separately with very good results. The modern conception of the physiopathology of the various anesthetics and methods is enabling us to suit the anesthetic and method to the condition of the patient and the requirements of the operative procedure, to the advantage not only of the surgeon, but also the increased well-being of the patient.

I do claim for the chloroform-ether sequence simplicity, cleanliness and safety. It is also a method that the average physician, with ordinary ability, can master with little practice. There are very few physicians who are not compelled, occasionally, through circumstances to administer anesthetics. For them this is the method of choice.

In conclusion the anesthetist should endeavor to consider the safety and comfort of the patient primarily, and use that method which he can master and wherewith he can assure the recovery of the patient and satisfy the demands of the operating surgeon as well.

ABSTRACT OF DISCUSSION.

Dr. F. W. Nagel, Montreal, Canada: I was much interested in Dr. Beebe's description of his apparatus and I thing he would be interested in one devised by Dr. Howell, in which two tubes, fitting on top of each other, are connected with the vaporizing chamber of the inhaler. The extra length of tubing is of especial advantage in enabling the anesthetist to concentrate his vapor if he finds occasion to require it.

Dr. Ralph Beebe (closing): I appreciate Dr. Nagel's calling my attention to Dr. Howell's modification of the inhaler. Personally I also think it an improvement to put the wires above the center of the inhaler to provide a larger air-space below. Several strands of wire are amply sufficient to hold the gauze and no impediment to breathing or vaporization of the anesthetic is introduced.

SPECIAL EDITORIAL COMMENT.

The January Supplement will contain some of the papers of the Symposium on Anesthesia for Oral Surgery, read during the Joint-Session of the Interstate Association of Anesthetists and the National Dental Association.

ALCOHOLISM AND DRUG ADDICTION AS COMPLICATING FACTORS OF ANESTHESIA.*

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Alcoholism and drug addiction are two of the most prevalent annoyances with which the anesthetist has to contend. They not only involve an extra hazard of life, but often jeopardize the satisfactory conduct of anesthesia and the operative procedure, and not infrequently precipitate untoward incidences into recoveries that otherwise should be uneventful.

Both conditions are no respectors of sex or social status and are encountered among the dregs of the humblest dispensaries as well as the aristocratic clienteles of the most exclusive hospitals. Both can be properly dealt with if previously recognized. Concealment, whether through ignorance or design, always proves disastrous.

In these days of propaganda for reform in everything it is essential to emphasize the fact that alcoholic and drug addicts, coming to operation under anesthesia, must be accepted as such and handled accordingly. Misdirected efforts at reformation invariably cause more danger and distress than the original complications involve.

In the routine surgery of alcoholics or drug addicts it is imperative to allow them their usual daily requirement of liquor or opiate. Such consideration will not only conserve what remnants of vital forces these derelicts still possess, but it will also render them manageable. On the contrary efforts at withdrawal or reduction below the minimum per diem requirements of alcoholic saturation or drug balance, will result, either in disconcerting nervous exaltation or imperiling physical collapse.

In the surgery of election, preliminary withdrawal or reduction may be tried, provided no operative procedure is attempted until the alcoholic or drug addict has reestablished a fairly normal condition. Such preliminary treatment is not a matter of a few days of alkaloidal medication and violent purging, as is advocated by some, but a long, tedious, restorative process, involving a complete reversal of metabolism, a resumption of functional activities and the elimination or control of psychopathic factors. This chapter on the cure of the alcoholic and drug addict remains to be written. Until this has been done, the surgeon and anesthetist must accept these extra-hazardous risks as such and give them the full benefit of every possible measure of conservation.

While alcoholics and drug addicts are both difficult subjects to handle under general anesthesia, the method of managing each and the respective dangers involved are somewhat different.

In many respects the effects of alcoholism on the tissues and organs resemble the results of strangulation. Even the casual observer realizes that the alcoholic is continuously underoxygenated, if not persistently cyanosed. The alcoholic is so hazardous a surgical and anesthetic risk because alcoholism affects all the protective forces and eliminative resources of the body.

Chronic alcoholism causes the following pathology:—

1. A persistent form of general acidosis.
2. Arterio-sclerosis and cardiac hyperthrophy.
3. Increased intracranial pressure and edema of the brain.
4. Cirrhosis or fatty degeneration of the liver.
5. Intermittent nephritis.
6. Cortical degeneration of the adrenals.
7. Increased susceptibility to infection.

In the preparatory regime of alcoholics for any operation under general anesthesia, it seems needless to reiterate the efficiency of the several measures for the control of acidosis. Carbohydrate feeding with the addition of fruit-juices and alkaline waters are always indicated. In toxemias associated with alcoholism glucose solutions should be given by rectum in conjunction with Fischer's solution intravenously in the presence of nephritis or edema.

In alcoholic "wet brain spinal puncture and withdrawal of fluid under sphygnomanometric control, according to the practice of S. P. Kramer, is anvaluable in almost immediately relieving the symptoms of acute delirium tremens or alcoholic coma. Kramer, Hogan and Fischer now favor replacing a portion of the spinal fluid with bromid solution. This remedial measure is available not only in the preparatory regime, but also in the control of postanesthetic sequelae.

Care must be exercised in preceding general anesthesia in alcoholics with hypnotics. While chloral, morphin, hyoscin and other drugs are available, they must be used with discretion and fortified with cardiac stimulants. Apomorphin is preferable to morphin and paraldehyde by rectum more satisfactory and less dangerous than chloral. Owing to the effects of alcoholism on the adrenals and brain, pituitrin is a veritable sheet anchor in all emergencies involving embarrassment of the circulatory system. Pituitrin replaces ergot, which has established itself in the treatment of alcoholic complications, and provides all the advantages of adrenalin without its influence being evanescent.

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916.

The alcoholic is a patient already partially under the influence of an anesthetic. Unfortunately the excitement stage of alcoholic narcosis is far more prolonged than that of any other anesthetic, and the effort to administer nitrous oxid, ether or chloroform, not only exaccerbates the pugnaciousness of these unmanageable patients, but almost invariably precipitates the following symptom-complex:—

1. An ascending degree of cyanosis. .

2. An increase of excitation.

3. Tonic or clonine spasms of the musculature; embarrassment of respiration; asphyxia and abrupt cardiac arrest, *or*—

4. Over-ventilation, followed by

5. Acapnia with pallor, apnea and gradual cardiac exhaustion.

The fact that alcoholics are under and out of anesthesia with disconcerting rapidity makes chloroform an especially dangerous anesthetic for these hazardous risks, because its administration invites the incidence of cardiac fibrillation.

While experts can handle alcoholics under nitrous oxid-oxygen anesthetics, with or without supplemental etherization, the method is extrahazardous as a routine and the margin of safety so narrow as to invite disaster. It is almost impossible to avoid imperilling cyanosis in alcoholics under nitrous oxid-oxygen, and this cyanosis, aside from its untoward results, may abruptly terminate in asphyxia and cardiac dilatation during the stage of excitement and struggling.

Two technics of anesthesia offer a safe and efficient method of narcosis for alcoholics:—

1. The Essence of Orange-ethyl chlorid—C_1E_5 Mixture by the semi-open drop method with concomitant oxygenation and

2. Ethel-Oil Colonic anesthesia (Gwathmey) with the preliminary use of paraldehyde.

The former is satisfactory because the Essence of Orange obtunds the inconvenient airway reflexes, so conspicuous in alcoholics, the ethyl chlorid obviates cyanosis and the C_1E_5 mixture gives all the advantages of these agents used separately, without any of their disadvantages. Concomitant oxygenation enables the anesthetist to prevent mild grades of persistent cyanosis and to induce and maintain, with less danger, a deeper and more satisfactory plane of surgical anesthesia. The semi-open method of administration gives just sufficient rebreathing to conserve the requisite carbon dioxid tension to prevent acapnia and apnea as a result of overventilation should struggling and excitement supervene.

Ether-Oil Colonic anesthesia is a satisfactory routine method, especially in the obese and plethoric type of patients. The minimal effect upon the brain and kidneys of this method and its freedom from respiratory reflexes, provided an open airway is steadily maintained, make it a technic of exceptional value.

Postoperatively alcoholics recover from anesthesia by crisis, but they are very subject to untoward sequelae. These must be combated by the remedial measures already indicated in the preparatory regime.

Provided the narcotic addicts' drug balance is painstakingly conserved, they will withstand anesthesia and operation with impunity. Bishop, the greatest authority in this matter, has formulated the following dictum:—

"The reduction of a drug of addiction below the amount of body need robs the addict of his most valuable asset in securing and maintaining recuperative powers."

Drug addicts are present in several types, each of which require a somewhat different method of handling.

1. Those addicts, who, except for the habitual use of opiates and a psychopathic taint, are otherwise practically normal.

2. Those addicts who use opiates to control the pain or symptoms of certain diseases, such as malignancy or diabetes, and

3. Those addicts, in whom the use of opiates is merely one phase of an entire moral and physical degeneration.

The first class react to anesthesia in almost the same manner as alcoholics. In handling them it is important to make their drug addiction serve the useful purpose of preliminary hypnotic medication. Each case should be studied in order to so arrange the dosage of the opiate that the period of somnolence will coincide with the induction stage of anesthesia. If induction is attempted during the excitement period of the narcotic, addicts are quite as unmanageable as alcoholics.

In the second class of addicts every effort should be made, unless an emergency exists, to put the addict into approximately normal condition before operating. These patients and the derelicts in whom the toxemia of infections and the ravages of malignancy have depleted the body of all the forces of resistance and recuperation, should be given the benefit of nitrous oxid-oxygen anesthesia. These patients must be persistently over-oxygenated, as their tendency is toward exhaustion of the circulatory and respiratory systems on account of the depletion of tissue respiration.

If these addicts show a breathing test of less than from 30 to 40 seconds, they should be considered unfit risks for general anesthesia.

In conclusion it may be stated as a working principle that alcoholic and drug addicts should be operated on under local or conductive anesthesia, except in the presence of infection or a tendency on the part of the tissues to slough, and only under general anesthesia when no other method of narcosis suffices for the required operative procedure.

When alcoholics or drug addicts are operated on under general anesthesia, they should have all the advantages of a thorough preoperative regime, a cautious and painstaking anesthesia and a carefully guarded recovery.

Alcoholism is one of the important factors in the morbidity of surgery and anesthesia that still defies the skill of the operator and the precautions of the expert anesthestists. Its elimination is a desideratum devoutly to be wished.

ABSTRACT OF DISCUSSION.

Dr. E. I. McKesson, Toledo, O.: I think that the trouble is that we do not know when we have an alcoholic. The patient comes to the table; and then for the first time we discover in three minutes that he is one. Therefore it has been my practice for the last two or three years, to divide the preliminary medication into two doses, giving a dose two hours before the operation. An hour after I judge, either personally or by report from the nurse, as to the effect produced by this first dose, and gauge the second dose accordingly. In this way, you have a little chance with an alcoholic by starting the preliminary medication long enough beforehand to control the alcoholic reaction by the second dose of the hypnotics. You will find a great many patients who are addicted to the use of morphin or opium in any of its forms, who are afraid to take their usual dose on the morning of the operation. They may not tell the surgeon, the anesthetist or anyone else that they are habitues; but if they come to the operating table without some method having been used to discover this fact they will have an underdose and make very unsatisfactory cases. Again, the concealment of the drug habit may lead to overdosage in the preliminary medication.

Dr. Chas. K. Teter, Cleveland, O.: I think that the most important thing in this paper from the standpoint of the anesthetist is that patients should have their usual dose of the drug they are addicted to on the day of the operation. A number of years ago, in a discussion of this subject, a number of anesthetists said that if a patient were an alcoholic, he should not have any of his favorite beverage given to him on the morning of the operation; but it seems that we have come to the conclusion now that it is best not to withdraw the dose, whether the patient uses alcohol as a stimulant or takes opium in some form.

Dr. C. C. McLean, Dayton, O.: I have surely enjoyed the paper very much, and I was wishing that Dr. McMechan would say just what was meant by drug addicts and alcoholics. We have all had our troubles, I think, with users of opium and alcohol, but I wonder if any of you have had any experience with a person who has been in the habit of using ether and chloroform. A few weeks ago I was asked to give an anesthetic in a case in which they had failed to anesthetize the patient the day before. I forget how much ether he had had, but it was plenty. It was a tonsil and adenoid operation. The patient was sent into the hospital, and I had my apprehensions as to what we could do. I am in the habit of giving the ether or ether and chloroform by the Gwathmey vapor method in the tonsil and adenoid work. I got the patient anesthetized to an exaggerated excitement stage, but not deeply enough to insert the mouth-gag and go ahead with the operation. We had to stop. I forget how long we were at it, but it was quite a while. The patient was a drug clerk, we found out afterwards, and was in the habit of inhaling chloroform and ether.

Dr. F. H. Nagle, Montreal, Canada: I would ask whether Dr. McMechan has had any experience with patients who have been alcoholics or drug habitues, but had given up the habit several years before the operation. I have had a number of cases of that kind, and in each case I had considerable trouble in the induction of anesthesia.

Dr. McMechan (closing): Dr. McKesson's point, I think, is well taken. It is only necessary to emphasize the fact that concealment of alcoholism or drug habituation is the thing to be feared. It should get out among surgeons and the laity that the anesthetist should be told. The nurses and physicians in these cases should not hide the fact. It is surprising how well a morphin addict will stand the most gruelling operative procedure, if he has managed to conceal about his person or the bed a sufficient amount of morphin to carry him through his stay in the hospital, which serves to emphasize Dr. Teter's remark that the usual dose of opium or alcohol should be administered.

With regard to Dr. McLean's experience with an ether and chloroform addict, I would state that reports have come in from several of the base hospitals in France in which certain surgeons and anesthetists are having considerable difficulty in anesthetizing ether drinkers. Apparently the only countries in which this habit is still prevalent are a few districts in France and one or two in Ireland. How it originated and why it continued, I do not know, but some surgeons in the war zones are getting just as unfavorable results from their efforts to anesthetize these ether drinkers as Dr. McLean experienced with the drug clerk.

Regarding the length of time that the alcoholic taint, so far as it pertains to anesthesia, persists, I would say that in the chronic old boozer, such as Dr. Nagel referred to of the type that you meet in the municipal hospitals and dispensaries, you will get the alcoholic reaction, irrespective of the time that he had given up the use of alcohol. I have had Dr. Nagel's experience in men who have reformed and have not touched liquor for ten years, according to their statement, but whether they spoke the truth or not I cannot say.

TO READERS OF THE SUPPLEMENT

¶ While the pages of the Supplement are replete with invaluable suggestions for advancing the science of anesthesia and analgesia, the advertising sections of the American Journal of Surgery contain many valuable pointers regarding apparatus, drugs, agents, and accessories that fulfill many of the requirements in the practice of these specialties.

It will be of interest then to the readers of the Supplement to refer to these advertising sections for anything they may need in the practice of their specialty.

No member of the profession is well equipped for the practice of his specialty unless he is familiar with the latest innovations that apply to his chosen field of endeavor.

THE ESSENCE OF ORANGE-ETHER VAPOR SEQUENCE BY THE CLOSED METHOD.*

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There is a wide difference of opinion among surgeons and anesthetists of large experience as to the method of choice in the administration of ether. This diversity of opinion but accentuates the fact that the ideal method is yet to be discovered. The methods in common use have their adherents who present various substantial reasons for adopting one or the other as the method of choice, and it is but natural for one to strongly recommend the method with which he has obtained the best results through skillful administration. Aside from other important considerations, there is one factor, the expert knowledge of administration by any particular technic, which is often overlooked or not mentioned in discussing the merits of any form of administration. In this connection familiarity in the use of any particular method of administration, not only has a direct bearing on anesthesia statistics, but no doubt accounts, in great measure, for the decided opinions which are expressed as to the relative merits of the different forms of administration.

From a practical standpoint the administration of ether resolves itself into two methods: the open and the closed, with various modifications, to suit individual preferences. It is claimed that in expert hands either of the methods herein discussed unless especially contraindicated can be used with practical equal safety. While the open method of ether administration has been used extensively in very large clinics and has a great many supporters among surgeons and anesthetists of unquestionable repute, well founded objections have been raised from time to time to the use of the open method of ether administration.

The advantages set forth by the enthusiasts of the open drop method are, the wide limit of safety, a method which is certain in its action, and requiring no cumbersome or expensive apparatus; these consequently will permit its administration in case of necessity by the untrained.

Open ether unquestionably has its limitations in spite of the fact that it is the routine method of choice in some very large and prominent clinics. A tendency seems to have developed to employ the open drop method to the exclusion of all others, thus suiting the patient to the anesthetic rather than the anesthetic to the patient.

No one who has had any considerable experience with really open ether will deny that the following are the usual objections urged against the method:

1. A long unpleasant period of induction, particularly in robust subjects and alcoholics.
2. Cold vapor from a dripping frosted mask, affording a very poor surface for vaporization.
3. No rebreathing with the consequent absence of CO_2 stimulation.
4. Waste of ether.

To quote from Bryant and Henderson: "It is not at all unusual to see a patient who throughout a prolonged operation, such as a difficult gallbladder or stomach operation, has had a really open ether anesthesia leave the table with skin pallid, covered with cold perspiration and more or less in a state of shock, and in whom recovery is slow and incomplete. His post-operative course is characterized by intense nausea and prolonged vomiting and the distressing abdominal distention. He becomes a subject requiring constant attention, and may even result fatally."

The closed method of ether has its disadvantages as set forth in an article published by Coburn from the Anesthesia Commission of The American Medical Association:

1. Disagreeable and prolonged induction.
2. Decreased oxygenation and increased CO_2.
3. Impossibility of regulating the dosage because of the necessity of pouring the ether into the inhaler intermittently.

The method that I desire to call to your attention overcomes each and every one of these objections and is based upon careful observation and study of three hundred administrations of the essence of orange-ether vapor sequence by the closed method. Most of the cases that were employed for the study of this method were limited to operations lasting one hour or more and were administered exclusively in hospital practice, so that we were able to carefully follow their post operative course. This series comprised: 49 gall bladder operations, 28 operations on the stomach, including resections and gastro-enterostomies, 16 kidney operations, 43 abdominal hysterectomies, and 74 lengthy vaginal plastic procedures.

Woolsey of Brooklyn developed and perfected the method herein described. His technic differed from that of the writer's only in the fact that he employed a foot pump for his air supply instead of an electrically driven pump. He sets forth the following virtues of the vapor method: small amount of ether consumed, continuous plane of narcosis, ether dosage is more constant and controllable, warm and moist vapor.

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*Read during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, Mich., June 12, 1916.

Woolsey, Gwathmey and the writer have used the method in over one thousand cases, not only without a fatality, but without uneasiness at any time.

The method approaches the ideal conditions because it furnishes a volume of air sufficient for respiration with a minimal concentration of ether vapor necessary to induce and maintain anesthesia.

The disagreeable induction is eliminated by proceeding the administration of ether by oil of orange vapor. The induction period is thus deprived of its terrors, the subject lapsing quietly into unconsciousness when the vapor is turned on. To quote from Gwathmey, the physiological basis for the beneficial effect of the oil of orange in the administration of inhalation anesthetics may be found in its prevention of reflex stimulation by the anesthetic agent of certain sensory nerves. The induction may be compared as with a good nitrous oxid-oxygen-ether vapor sequence and its duration averaged six minutes in this series. In my series of three hundred cases, struggling manifested itself appreciably in only one case. The period of excitement is absent or reduced to a minimum. I believe that struggling can be nearly always eliminated and the second stage be bridged over by the very gradual addition of ether vapor. Difficulty in inducing anesthesia arises when the early dosage is so irritant as to cause coughing, light breathing, or holding the breath. A marked second stage is the fault of the anesthetist and not the method.

Decreased oxygenation does not pertain when ether is given in this way. The patient is sufficiently oxygenated at all times and there is no cyanosis at any time. Anoxemia or oxygen deficiency can not occur when the air supply is forced into the bag by an electric motor and blower. The air supply is constant and unvarying. Rebreathing is continuous, and a part of the rebreathed air escapes constantly. In the light of recent research, partial rebreathing is of distinct advantage. The stimulating effect of CO_2 upon the medullary centres is convincing evidence as to the value of rebreathing. Clinically this fact is evident enough, and it is unquestionable that rebreathing small quantities of CO_2 is an efficient means of maintaining respiratory and cardiac function and preventing or alleviating surgical shock. Clinically I have been able to demonstrate the value of rebreathing repeatedly in a great many grave surgical risks. After a two hour procedure involving the upper abdomen, such as resection of part of the stomach for carcinoma, the patient leaves the table with color excellent, skin warm and dry, breathing quiet and regular, and with a pulse strong and little, if at all, accelerated. Recovery from the anesthetic is, as a rule, prompt and complete, and from personal experience, I can say that the period of recovery is shorter than by any other method of ether narcosis. Return to consciousness is marked by the absence of prolonged nausea or vomiting. Carefully kept records of my series showed that 27 per cent. of the patients vomited after being returned to bed. The majority of this number vomited only once before consciousness had fully returned.

It is an unquestionable fact that anesthesia is good in proportion to its uniformity. The administration of any anesthetic should be as nearly uniform as possible throughout its entire administration. Anesthesia accidents do not as a rule occur when a uniform deep anesthesia is maintained, but come particularly to those who administer irregularly, thus permitting the patient to come out of the anesthesia and again plunging him into deep narcosis. This objection is overcome by the continuous and even administration of ether vapor. Thus the ether dosage is constant and under complete control of the anesthetist. The depth of the anesthesia never varies, always even and tranquil; the ether vapor is constant in strength, moistened and warmed, thus conserving a considerable amount of body heat. The anesthetist can carry the patient at a low level of anesthesia, changing rapidly to a higher, as required by particular exploration or manipulations.

From a rather extensive personal experience with the various methods of ether administration, I am satisfied that with no other method of ether anesthesia do we have the patient under such perfect control as with closed ether vapor. Ether waste is entirely eliminated. The amount of ether consumed in my series averaged 2½ ounces per hour.

The apparatus employed for the administration consists of an electric motor and blower, the Gwathmey three bottle apparatus, and an inhaler which has the rebreathing bag close to the patient's mouth. The technic is that described by Gwathmey. The water bottle of the ether container is filled with two ounces of water to which are added one to two drams of a 25 per cent. essence of orange. About one ounce of ether is placed in the small chloroform bottle. Four ounces of ether are placed in the ether bottle. The bag is now filled with air pumped through the water bottle which contains the essence of orange. The mask is placed upon the patient's face and the patient breathes back and forth into the bag. The motor is started and sufficient air is pumped to keep the bag over 2/3 full at all times. The index is gradually turned towards the ether contained in the chloroform bottle. The patient is now getting a very small amount of ether which is apparently imperceptible. Should coughing, holding the breath or struggling occur, the ether is turned off again. The addition of ether should be very gradual. The index is now again gradually turned back to the ether contained in the chloroform bottle and slowly increased until the index reaches full ether of the chloroform bottle. The patient will now be found to be in a state of full surgical anesthesia, the average time required to reach this stage being six minutes. When this is accomplished the index is turned back to air again and gradually turned towards the ether bottle. Anesthesia is maintained with the index turned about a half inch from air, between air and ether, the percentage being regulated according to the patient's condition. The expiratory valve is at all times slightly open. The bag remains moderately distended, a slight positive pressure being a decided advantage. The breathing with this form of anesthesia is quiet and regular. The mucus rale and snore are absent. Salivary and mucus secretion is greatly diminished or absent altogether. An artificial airway was seldom found necessary. The lid reflex is absent, the eyeballs are rolling, but the patient is sufficiently relaxed for all surgical operations. Relaxation is obtained in a much shorter period, particularly in difficult upper abdominal procedures than with any other method in my experience. The pulse is nearly normal and the patient's color is always pink. A purplish tinge or cyanosis is never present. The conditions contrast strongly with those often seen under the older methods of closed ether administration. Return to consciousness is rapid and characterized by diminished nausea or vomiting. Over seventy per cent. of my cases had no post operative vomiting. There were no cases of protracted vomiting. After being returned to bed they rest quietly for a few hours and then awake as if from a natural sleep.

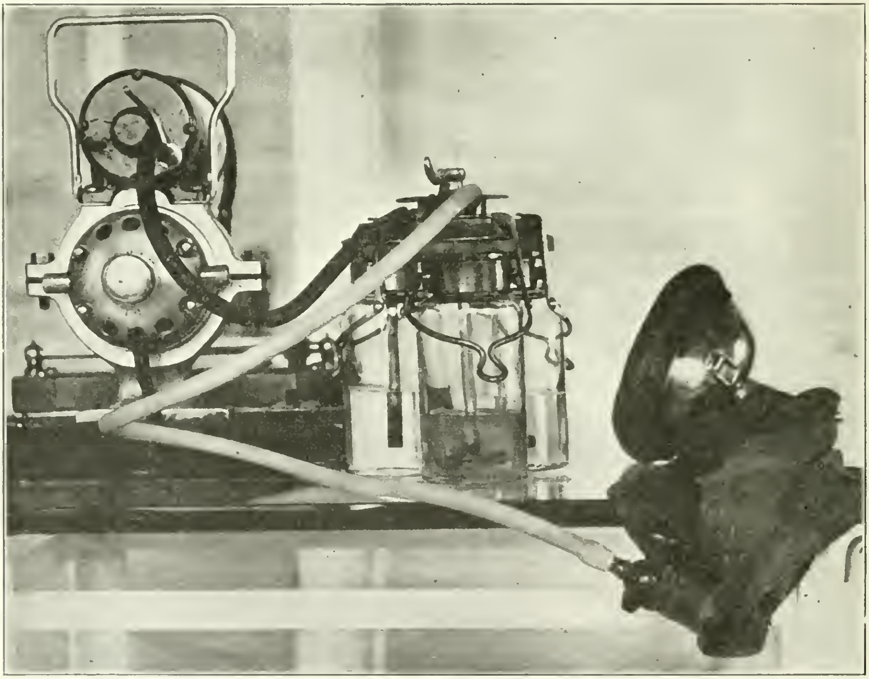

Fig. 1. Author's Apparatus for Essence of Orange-Ether Vapor Sequence.

To summarize, the method approaches the ideal anesthesia more closely because of the following factors:

1. Rapid, pleasant induction devoid of excitement.
2. An even maintenance under constant control with perfect relaxation.
3. Air supply sufficient for propor oxygenation with continuous partial rebreathing.
4. Prompt and uneventful recovery.

259 BROOKLYN AVE.

ABSTRACT OF DISCUSSION.

DR. RAY A. RICE, Columbus, Ohio: I want to get up right away and discuss this paper. Dr. Kruskal's idea concerning the closed ether method certainly meets with my approval. I have given anesthetics in all ways, and with almost all manner of apparatus. In my opinion, the open method is very inferior. I used it for several years and found that too much of the vapor was wasted, and that I got too much of it myself. During the past year, I have used what is practically an entirely closed method in continuing my anesthetics. However, I do not start my anesthetics in the way that Dr. Kruskal does. I have a semi-closed inhaler drop method of my own that I use to get my patients to sleep; but when I get them on the table in the operating-room and they are well relaxed, I switch to an entirely closed method, which is different from Dr. Kruskal's in that I vaporize my ether by passing oxygen through it. In this way, I get a pure oxygen-ether vapor. It is entirely a rebreathing method. I use Coburn's metal breathing tube and have, in addition to that, a bag; and a connecting apparatus with a tube runs from Gwathmey's three-bottle vaporizer, which I have used for several years in nose-and-throat work. A low-pressure oxygen tank is used to vaporize the ether; and I have a piece of rubber around the tube that fits between the lips and the gums. The patient gets no outside air at all, the nasal passages being stopped up. This gives me the most perfect anesthesia that I have ever seen. The patient has to be entirely relaxed before the breathing tube is inserted. There is sometimes a coughing and strangling sensation, which the patient does not know about, of course. I have used this method for a year or over, with entire satisfaction. I think that the rebreathing method stimulates respiration and heart action and prevents shock. I seldom see a patient in a cold, clammy perspiration such as you see in shock; so it must be the ether-oxygen anesthesia that is stimulating and prevents that trouble. Of course, my patients all have a preliminary hypodermic of scopolamin and morphin, with an additional 1/150 of atropin. They never have mucus in the throat. I never have to hold up the jaw any more, because the tube passes in beyond the root of the tongue and holds it up.

DR. ISABELLA HERB, Chicago: I, too, want to get up at once to say that I disagree with Dr. Kruskal as much as Dr. Rice agrees. Dr. Kruskal gives his average length of induction as six minutes. I give seven minutes as mine. With the open-method my patients never have coughing or strangling, because I give plenty of air in the beginning, which does not lengthen the time required for giving the anesthetic. If you employ a concentrated vapor the patient will hold his breath.

So far as the cold vapor is concerned, I should like to speak of this; but, as Dr. Davis is to read a paper on it later, I will pass this by. In regard to regulating the dose, I would say that you must give enough to keep the patient asleep. The operation will regulate that. Of course, the different structures of the body have different degrees of sensitiveness; and if the anesthetist keeps in touch with the surgeon, he will know at what stages of the procedure the patient must be kept more soundly asleep than at others. He must vary the depth of the anesthesia according to the requirements of the operation. The patient should not be kept too dead asleep or too lightly anesthetized, but must be kept quiet at all times.

Nausea and vomiting, we might say, are things of the past. With the open-method we have very little. The patient may vomit just before awakening; but, as a rule, not very much. We do not average more than fifteen per cent. of cases of vomiting with the open-method. Abdominal tension, I have certainly noticed after the open method; but so far as shock is concerned, I have never seen this produced by an anesthetic. When I have seen it, it has been due to hemorrhage, to the operative procedure, or to too profound a degree of anesthesia. I think that the latter statement I should really modify. If the patient dies, it is not from shock, really, but from paralysis. When one uses the word shock, one should also describe the condition. I believe that you cannot produce shock with the anesthetic, but that it arises from other factors that enter into the procedure. Not long ago, another physician noted what I have noticed many times, and that is the rapid breathing that accompanies the rebreathing method. He counted forty-six or forty-eight breaths to the minute. You never see that in the open method of etherization. If you have used proper technic, the patients breathe naturally. So far as patients' leaving the table in the condition that Henderson described as acapnia, I do not think that this is due to the anesthetic agent. I have not seen a condition such as he has described due to the ether. If the anesthetist piles the ether in and has it dripping off the mask, it is not the fault of the method, but of the anesthetist. We do not have excitement, except in alcoholics; but you have that, regardless of the method that is employed. That stage soon passes off, however.

Dr. Rice spoke of absolute rebreathing and said that he uses oxygen vapor, passing it through the ether; and said that he never gives his patients outside air. No, of course not; because it is the oxygen of the outside air that it required, and his patients are getting all the oxygen they need.

DR. CHARLES K. TETER, Cleveland: I have enjoyed this paper very much. It again brings to the attention of anesthetists the fact that we are all learning and the general profession is learning that the success of anesthesia depends more on the skill of the anesthetist than on the method that he may use. In the closed method of ether anesthesia, as Dr. Kruskal has explained, we undoubtedly have a very excellent method indeed. He uses atmospheric air in place of oxygen, and Dr. Rice goes to the other extreme of using no atmospheric air; so we have both extremes. I halt between the two extremes. Instead of using the nitrogen in the air, I use the oxygen and a small amount of nitrous oxid; and I find that I obtain better results than from just using the oxygen passed through ether. It prevents an over percentage of carbon dioxid in the rebreathing mixture. I have had more satisfactory anesthesia and better results since I have been using this combination than I had before. I think that most of the technic we are using are good, and that it is merely a matter of perfection of technic in the method that we select. The point of the whole thing is accuracy and constancy of the dosage. When you have the proper depth of anesthesia established, you should then use only enough of the anesthetic to maintain this. The thing that we are all striving for is to obtain the best result.

DR. L. SEALE HOLMER, London, Ontario: I should like to ask whether Dr. Kruskal uses preliminary medication, and what lung complications he has with this method in comparison with the open drop method—that is, whether these are exaggerated in his method or not?

DR. W. M. BOOTHBY, Boston: There is just one pharmacological question, brought up by Dr. Herb, that I should like to speak of. She said that you cannot produce shock with ether. Of course, she does not do so, because she does not carry her patients to that depth of anesthesia. The only thing that I wish to bring out is that if you employ a higher ether tension, this will occur. In rabbits, you can maintain normal blood pressure when you use 42 mm. of ether tension; but if you run up to 50 mm., the blood pressure falls and the animals die through the action of the drug. Of course, Dr. Herb has never seen this occur. However, I think that it is a mistake to let the teaching go out that ether will not produce lowering of the blood pressure; and I have taken it that there is a corresponding diminution of blood pressure in clinical cases. You can put the patient into a definite surgical shock by this means. Of course, you are not to push the anesthetic too far. The result is due to a too high strung development of tension in the body.

Dr. Harper: The word shock has been used a great many times. I think that the word collapse would be better. The latter word should be used when describing the effect of a too profound anesthesia. Shock is due to post-operative hemorrhage, and this word should not be used in connection with anesthesia by itself.

Dr. J. T. Gwathmey, New York City: I enjoyed this paper, because it introduced a practically new method of giving ether; and it is one of the best methods, it seems to me. I do not think, however, that any of us now know which is the better, the open or the closed method. I have used both without producing shock.

The question comes up of a comparison between this method and the gas-ether sequence, the gas-oxygen-ether and the drop method. I look upon the gas-ether sequence and the drop method as two pioneer methods that should be methods of the past. Occasionally we have a death in the first two or three minutes, because no oxygen is used, in the former; and the drop method should also be a thing of the past, because it does not matter how accurate you may be, you cannot approach in accuracy that of a mechanically driven air supply. I think that Dr. Herb, for instance, would get better results if she would try one of these methods, either the open or the closed, comparing the results with those she now gets. It is not a comparison between the anesthetics, but between the methods of administering them. Dr. Kruskal has used the drop method and has finally evolved this method that he now employs. If what Dr. Herb says is true, that we must have struggling with alcoholics, then this method is superior to the drop method; because we do not have it with Dr. Kruskal's method. I have never seen a patient struggle under this method.

All my patients have preliminary medication. In regard to the amount of ether, two ounces and a half in an hour's administration, when absolute relaxation is obtained, cannot be approached by the drop method; and the results are beyond anything that can be produced by the drop method.

Dr. Nagle, Montreal Canada: This method appealed to us so strongly in Montreal that in our new surgical pavilion we have a compressed-air plant; so that the anesthetic can be mixed before it reaches the patient, and more or less accuracy of dosage is obtainable. I have tried to get it absolutely accurate. I think that the success of Dr. Kruskal and Dr. Rice all depends on getting the anesthetic well mixed before reaching the patient.

Dr. W. D. Gatch, Indianapolis, Ind.: Do you use a positive intra-pulmonary pressure?

Dr. Kruskal: The bag is two-thirds distended, so there must be a positive pressure of eight or ten millimeters. The bag is nearly always distended.

Dr. Boothby: It cannot be so much as that.

Dr. E. I. McKesson, Toledo, Ohio: With a rubber bag two-thirds distended, the pressure will not run over three millimeters of water. I have been making some experiments along this line.

Dr. M. P. Denton, New York City: I think that five millimeters would be the approximate amount of tension.

Dr. Teter: I have been working with positive gas-oxygen anesthesia for many years, and taking the pressure; and I have found that with the bag a considerable distance from the patient and with a positive pressure of five millimeters in the bag, there was a negative pressure during inhalation. Therefore, I now take the bag up directly to the inhaler. With a large opening and with four millimeters of pressure in the bag, the inhalation pressure is 2¼ mm.

Dr. F. L. Richardson, Boston: I think that at the end of two years, when all this information is boiled down, you will not be using either the open or the closed method. In certain cases, we shall use a closed method; and in others, an open method. There are certain cases in which I think that the patients would be benefited by the use of the closed method; and in these cases, I change to it. I think that the time is coming when we shall not stick to any one method, but shall select the one adapted to the particular case.

Dr. Kruskal (Closing): I do not believe that I can answer all the questions. With reference to the induction, it was not always done with the closed orange-ether. We can induce anesthesia with gas-oxygen. I have done that repeatedly. You can do that, and then change to ether vapor.

With reference to using oxygen instead of air, I do not see any particular advantage in it. except in grave surgical risks. In reference to premedication, I would say that in all cases I gave morphin and atropin, but never scopolamin, unless contraindicated. A few patients had doses of chloral and potassium bromide by rectum an hour beforehand. In two robust individuals, I found a dose of this of decided advantage.

Dr. Gwathmey has answered Dr. Herb so very well that there is nothing left for me to say. The reason I use closed ether is because it has a decided advantage over open or semi-open. I would not go back to any method except a vapor method of ether administration. I think that there is a decided advantage in furnishing definite quantities of ether mixed with air directly to the patient.

Now, in regard to the question about pulmonary complications, I would say that these were difficult to follow in this series, in which a great many cases were acute surgical conditions. In this record, there were 45 gall-bladder cases and acute kidney conditions. It is necessary to assume that pulmonary infarcts and emboli occur in these conditions, and I could not tell whether they were purely post-operative pneumonias or the result of the operation. I am now working on the problem of determining which are postoperative and which are not.

In closing, I would say that I realize that open and semi-open ether can be given with satisfaction; and most of us could, in a simple, ordinary fifteen-minutes procedure, get as good results with them. The operations that I refer to, however, are those lasting for a long time, where profound relaxation is required, and involving a great deal of operative surgical shock. I have limited the cases in this paper to grave surgical conditions.

NITROUS OXID-OXYGEN ANALGESIA IN OBSTETRICS.*

Carl Henry Davis, M.D.,
Associate in Obstetrics and Gynecology, Rush Medical College; Assistant Attending Obstetrician and Gynecologist to the Presbyterian Hospital,
Chicago, Ill.

The conduct of labor among our primeval ancestors was purely intuitive. In difficult cases the older women of the tribe would assist with pressure, massage and nauseating drinks. With the earlier forms of civilization some of the older women assisted during labor and the priests gave spiritual or mechanical assistance in difficult cases. From the time of Hippocrates 400 B. C. to 1550 A. D. the practice of obstetrics among the civilized races remained practically the same. Normal labor was wholly in the hands of women who may be termed practical midwives, and medical men were called only in cases of dystocia. There was a total ignorance of anatomy and physiology; the cephalic presentation was the only natural or hopeful one; labor was supposed to be a voluntary act on the part of the child and unless it came naturally its life was utterly disregarded and the barber surgeon was called to remove it with destructive instruments.

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*Read during the Second Annual Meeting of the Interstate Association of Anesthetists, Louisville, Ky., July 26-27, 1916.

But with the anatomica description of the human pelvis by Vesalius in 1543 and the delivery of a live child with podolic version by Paré in 1550 the scientific investigations which have resulted in our present obstetrical knowledge were started. Louise Bourgeous published the first *Midwifery* in 1600 or twenty-eight years before Harvey discovered the circulation of the blood. Rousset performed a Cæsarean section in Paris in 1581 while the straight forceps of Chamberlaine were not introduced until 1668. Obstetrics was first recognized as an important branch of medicine in 1720 when Gregoire established the first obstetrical chair in the Hôtel Dieu in Paris (Engelman).

The development of the science of obstetrics has been extremely slow. There has been more progress during the past seventy years than during all the preceeding centuries. Nearly three hundred years after Paré did his first podolic version our own Oliver Wendell Holmes called attention to the cause of childbed fever, and the teachings of Semmelweiss and others prepared the way for the development of modern scientific methods in obstetrics. That childbirth is still the most dangerous event in the life of the average woman is not due to lack of scientific knowledge regarding this most important function of woman, but rather to the stupidity of man, who is instinctively penny wise and pound foolish. There is abundant proof that scientific obstetrics does remove most of the dangers associated with the bearing of children, yet, due to the continued practices of ignorant and unclean midwives, both male and female, the average mortality from childbirth is as great today as before the discovery of anesthetics and antiseptics.

"The ancients fully appreciated the increased susceptibility of the nervous system of women during pregnancy and in the puerperium; the law in Carthage and in Athens forbade the pursuit and punishment of a criminal or murderer who sought refuge in the home of a woman who was pregnant or had recently given birth to a child" (Englemann). Yet very little attention was given to the relief of pain during labor until the time of Sir James Y. Simpson. For seventy years our best obstetricians have endeavored to mitigate the pangs of labor, using whatever analgesic seemed best suited to the individual case.

Within the past two years without an apparent thought for safety many lay writers and a few physicians have created an almost hysterical demand for painless obstetrics. The present hysteria may be made productive of much good, if we as physicians will show our patients the obvious need of better obstetrics. When the average citizen learns that a human life has a real value in dollars and cents, possibly the politicians who rule us may give our women and children a few hundred thousand dollars after they have spent our millions for cattle and hogs. May God hasten the day when human life and suffering are placed at least on par with commercial enterprises!

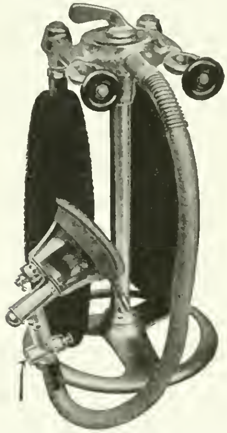
Seven years before Robert Fulton built the first successful steamboat, Sir Humphrey Davy discovered the anesthetic properties of nitrous-oxid. However, it was used only in amusing laboratory experiments until Horace Wells inhaled it during a tooth extraction in 1844, and after that it was little used until after Edmund Andrews and Paul Bért, working independently, showed that its dangers were due to the lack of oxygen. Working in the early eighties with an extremely crude apparatus, Klikowitsch and Winckel showed the value of nitrous oxid-oxygen analgesia in normal labor. That its use has been revived is only natural, and, considering the many objections to other anesthetizing agents, we wonder why the remarkable results reported by these two scientists were ignored so long.

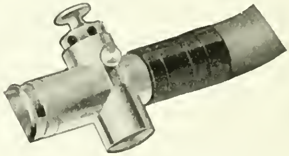
Limitations in the use of opiates during labor have been recognized for at least a century. William P. Dewees in the second edition of an essay on "The Means of Lessening Pain and Facilitating Certain Cases of Difficult Parturition," published in 1819 by Thomas Dobson & Son, Philadelphia, says: "I have in a number of instances seen opium exhibited with a view to mitigate the severity of the pain, when labor advanced slowly, and have never failed to observe that the force of the contraction was diminished at the time it was required to be the strongest."

Chloroform and ether have been used since 1847, and certainly have proved a blessing to thousands of women. Chloroform, because of its greater toxicity, is gradually being discarded in America. Great public interest has been aroused in the morphin-scopolamin treatment because of its exploitation in the lay press; but following a temporary burst of enthusiasm by a few medical writers, its known limitations are leading to its general disuse except as a preliminary measure in a small percentage of cases. From an extended and careful study of analgesia and anesthesia in labor, I believe that, in order of safety, nitrous oxid-oxygen is first, ether second, chloroform third, and morphin-scopolamin fourth.

In the recent attempt to justify the use of chloroform during normal labor, Hill argued that the body changes found to occur when chloroform is used experimentally were due largely to the element of shock arising out of the animal's fear. If his argument were sound the same changes would occur regardless of the anesthetic employed, since the element of fear is constant. The experiments of Woodyatt and Graham indicate that such is not the fact, since they found that these changes are much less marked when ether is used and are practically absent in animals to whom nitrous oxid was administered for a much longer time.

Since it is generally agreed that, when properly employed nitrous oxid and oxygen is the safest of anesthetizing agents, and that, when given to the stage of analgesia, death from its use is inconceivable, the only objections to its administration during labor must arise from its cost and the difficulty of administration. Unfortunately nitrous oxid and oxygen does cost considerably more than ether or chloroform; and, while its wider use will result in a reduction from present prices, nevertheless the greater difficulty of storing and distributing will keep the cost well above that of ether and chloroform. As I have stated in other papers, the average cost per case for the gas has not exceeded five dollars, although in a few instances it has cost as much as ten dollars. The administration of the analgesia was, in our earlier work, very time consuming and tiresome, but with the simple technic which I instituted last year the patient who has the nitrous oxid-oxygen analgesia during labor requires no more careful watching than the patient who has ether, chloroform, or no anesthetic. So far as I can determine, there are no contraindications to the employment of the nitrous oxid-oxygen analgesia other than the practitioners' ignorance regarding the science of obstetrics and the administration of this agent. Any physician capable of giving proper obstetrical care can, in a comparatively short time, master the technic for administering the nitrous oxid-oxygen analgesia during normal labor. A special anesthetist is not needed except in the abnormal case where some operative procedure becomes necessary. During the earlier part of labor the patient can administer her own analgesia, and, when bearing down efforts are desired, an interne, the nurse or some other member of the family can hold the inhaler over the patient's face and release the gas when the uterine contraction begins.





Figures 1, 2. The A. C. Clark Apparatus in use by the author for nitrous oxid-oxygen anesthesia and analgesia in obstetrics. (2) The trigger-valve for the self-administration method.

TECHNIC FOR ADMINISTERING NITROUS OXID-OXYGEN ANALGESIA

Preparation of Patient: The patient is prepared as for any normal labor. There is no objection to her taking such food and drink as she may desire, provided it is given in small amounts. A woman in labor is doing hard work and requires nourishment.

Time for Beginning Analgesia: Our patients are told that the analgesia will be started whenever they desire it. But we explain that early in labor they will have merely cramps and that so long as they are not severe there is no need to use the gas. It is rare that a patient will need the analgesia until near the end of the first stage and many feel very little pain until the second stage of labor is well advanced.

Posture of Patient: The patient's comfort is of primary consideration. Early in labor she may assume a sitting or semi-reclining posture, but when the head comes down on the perineum she should be placed in the position desired for delivery. Usually our patients are delivered in the dorsal position.

Apparatus: There are several good nitrous oxid-oxygen machines on the market and any one may be used to administer the analgesia. The obstetrician must, however, be familiar with the mechanism of his appartus, and the machine, which requires little manipulating, enables him to give more attention to the patient. A free, easy passage of the gases is necessary. All valves must be working easily and perfectly. The apparatus should have two bags, one for nitrous oxid and one for oxygen, or some other means of sight feed which will show that both gases are available at all times. Machines which have automatic pressure regulating devices should have also other connections which will allow a direct passage from the cylinders to the bags, since any delicately adjusted mechanism may at times fail to work properly. Care must be taken to prevent a leakage of the gas from the tops of cylinders and connections about the apparatus. A little leak is one of the greatest sources of unnecessary expense and may, in course of a few hours, prove very costly.

In hospital practice the large cylinders should reduce the cost of the analgesia. But for the home the small cylinders are more satisfactory.

We use a nitrous oxid-oxygen apparatus equipped with automatic regulating devices based on the general principal of the automatic water regulators in toilets. These allow gases to flow from the cylinder only as the patient inhales the gases and thereby reduces the pressure in the bags. With these regulators it is possible to maintain the desired *low* pressure in the bags during either intermittent or continuous administration.

When I first tried self-administration, I used an old inhaler with a slide shut-off valve in its intake, but as this was rather unhandy the manufacturers have constructed an automatic feed which may be inserted in the gas line next to the inhaler. Using this apparatus with automatic regulators and automatic feed, a patient requires no more careful watching than the patient who has no analgesic. The regulators are set so that when the gases are turned on, the bags will remain about one-third distended. The valve in the mixing head is set so that the mixture will contain about five per cent. oxygen. Using the small portable model of the same apparatus, which does not have the regulating devices, it is necessary for some one to replenish the gases during the interval between contractions.

Administration: As soon as the patient desires the analgesia, the gases are turned on; the apparatus is placed to the right side of the delivery bed; the patient is asked to hold the inhaler by placing her thumb on the slide valve of the automatic feed and the fingers over the upper portion. During an interval between contractions she is asked to place the inhaler over her face, press up the valve with her thumb, and to take five or six slow, deep inhalations of the gas so that she may experience the sensations of analgesia. She is then told that she shall place the inhaler over her face and breathe in the same manner when she feels the first suggestion of the next contraction. When she has counted four, five or six inhalations, according to the number required to secure relief from the pain, she releases her thumb and breathes air through the inhaler which is kept over the face until the end of the contraction. Should she at any time feel a little pain she can take another inhalation by the simple pushing up with her thumb. It is rare that a patient will not follow instructions and breathe enough gas to lose consciousness, but even then she can do no harm, since her thumb will relax and the valve close automatically. The breathing of air will quickly restore normal consciousness.

A number of my patients have administered their own analgesia for more than five hours. They find this a rather delightful diversion during the long hours of *wakeful working*, and some are reluctant to give up the inhaler when strong bearing down efforts are desired near the end of labor.

Types of Patients: Winckel in his early work observed the difficulty in administering a nitrous oxid-oxygen analgesia to women of low mentality. Large women of the masculine type and those suffering from obesity usually require a large amount of gas. Hysterical women usually cause some trouble, especially when the gas is started late in labor. Primiparae cause more trouble than do multiparae. Some women have very irritable uteri and the painful stage of the contraction is reached so quickly that with the usual method of administering the gas no relief is secured. But by varying the technic to suit the individual case, and occasionally administering a continuous analgesia I have been able to secure satisfactory results in all classes of patients.

VALUE OF NITROUS OXID-OXYGEN ANALGESIA

From our experience we believe that nitrous oxid-oxygen analgesia is the most satisfactory and safest method which has yet been employed to relieve the suffering labor. It may with minor variations in technic be used successfully in every case which requires an analgesic during the painful stage of labor. However, for the discomfort which accompanies a prolonged first stage with little or no dilatation of the cervix, chloral hydrate, heroin hydrochlorid, or morphin-scopolamin treatment is usually indicated. Nitrous oxid and oxygen cannot prevent dystocia from a disproportion or a mal-presentation, but it does lessen the dangers from maternal exhaustion without an increased risk to the child. We have found the second stage of labor somewhat shortened because of better cooperation on the part of the mother. There is less surgical shock and as a rule the patients make a smoother recovery. The babies show no increased evidence of asphyxia and cry as quickly as do those, whose mothers have no analgesic.

Nitrous oxid and oxygen has been widely used for a number of years and its safety as an anesthetic is generally recognized. Within the past two years the analgesia has been used by scores of physicians and in hundreds of confinements, yet no physician who has used it long enough to develop a satisfactory technic has failed to recognize its value in obstetrics. The use of the nitrous oxid-oxygen analgesia cannot take the place of clean, scientific obstetrics, but it does relieve the agony of labor and it should prove a blessing to thousands of women.

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OCTOBER EDITORIALS. 1916

INSTRUCTION OF MEDICAL STUDENTS AND HOSPITAL INTERNES IN ANESTHESIA.

In his Presidential Address before the Fourth Annual Meeting of the American Association of Anesthetists at Detroit, June 12, Dr. Willis Drew Gatch, Professor of Surgery in the University of Indiana Medical Department, presented much food for thought. Unlike most critics, Dr. Gatch has the courage to present a plan for constructive reform. This plan dovetails into the routine courses of the curricula of all medical schools and can be readily adapted to the purposes it is meant to serve. Dr. Gatch has gone even further and personally introduced the excellent procedure into hospital routine of having a trained anesthetist responsible for the preliminary examination and preparation of the patient for the operative ordeal and the patient's immediate post-operative care. Thus the specialist in anesthesia assumes his proper role as a vital factor in the surgical team. Also the specialist in anesthesia becomes the supervisor of the department of anesthesia in the hospital and the clinical instructor of the internes in the anesthetic service.

Dr. Gatch's plan (herewith presented in the SUPPLEMENT) is a credit to him, since it conserves all the rights and privileges accorded the licensed anesthetist under the Medical Practice Acts of the various States, and yet solves some of the difficult problems that present in the instruction of medical students and hospital internes in anesthesia. It is to be hoped that the committee appointed by the American Association of Anesthetists to handle this matter, and indorsed by the Interstate Association of Anesthetists, will be able to put Dr. Gatch's plan into routine use in the medical schools and hospitals of the country as rapidly as possible.

F. H. M.

THE OHIO STATE MEDICAL BOARD AND THE NURSE-ANESTHETIST.

At the recent meeting of the Interstate Association of Anesthetists in Louisville, Ky., July 26, the following motion was adopted unanimously:

"That the Association, through its officers, the official journal and its individual members, bring to a definite end the administration of anesthetics by unlicensed persons in every State of the Middle West in which such an action can be secured."

In consonance with this determination, a petition in this respect, signed by prominent physicians, surgeons and anesthetists throughout Ohio, was presented to the Ohio State Board and at its meeting, August 9, the Board adopted the following resolution:

"WHEREAS *it has been charged in a petition, signed by many well-known and reputable physicians, that the law regarding the administration of anesthetics by others than licensed physicians, has been systematically violated by the Lakeside Hospital, Cleveland, Ohio, and that courses in anesthesia are given nurses in Lakeside Hospital for the purpose of and with the intent to violate the above-mentioned law.*

"BE IT RESOLVED, *That until these charges are disproven and such courses, if given, discontinued, that all recognition of the Lakeside Hospital as an acceptable training school be withheld and recognition of its graduates as registered nurses be denied."*

If this action on the part of the Ohio State Medical Board to abolish the nurse-anesthetist abuse, does not suffice, the Interstate Association will present evidence to the Board warranting prosecution under the law.

It has been announced that the authorities of Lakeside Hospital, backed by the Cleveland Hospital Council and the Ohio Hospital Association, have requested a hearing before the Board and this will be held in Columbus October 2, at which time all the parties interested will appear for a discussion of the nurse-anesthetist abuse. Unless the Board continues to sustain the licensed anesthetists, the matter will be taken into the Ohio State Medical Association for adjustment. F. H. M.

Book Reviews

A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.

Practical Medicine Series: General Surgery (Volume II). Edited by John B. Murphy, A.M., M.D., LL.D., F.R.C.S., England (Hon.), F.A.C.S.; Professor of Surgery in the Northwestern University; Attending Surgeon and Chief of Staff of Mercy Hospital and Columbus Hospital; Consulting Surgeon to Cook County Hospital and Alexian Brothers Hospital, Chicago. Series 1916, cloth, 620 pp., illustrated. The Year Book Publishers, Chicago, 1916. Price, $2.00.

This volume of the Practical Medicine Series as usual includes a brief review of many advances in anesthesia and analgesia. Wiltsie discusses the question *whether the anesthetist is sufficiently trained as a surgical assistant.* He concludes that a decision must be arrived at as to whether licensed physicians or nurses shall monopolize the administration of anesthetics, and then that whichever experts are selected, sufficient training should be given to make them proficient. Henderson and Bryant are quoted on their recent researches in acapnia and apnea as influenced by open, semi-open and closed methods of etherization, the Rovsing mask and technic being explained in detail. The newer apparatus of Layton for vapor anesthesia, of Sutcliffe for the drop method, the modification of the Ferguson inhaler by Wolfson, the improved inflatable cushion of Coburn for nitrous oxid, and the improved pharyngeal tubes of Lumbard and Pinneo are described and illustrated.

Brenizer's scopolamin-morphin-cocain technic of anociassociation is given in detail, and considerable space is also devoted to Harris' researches on nerve-blocking and the value of calcium chlorid in prolonging the obtunding effect of local analgesics. The experiences of Boit with brachial plexus anesthesia and those of Bull with extradural anesthesia are recounted. Bevan's studies in the choice and technic of the anesthetic are included, as well as the pertinent clinical conclusions of Dagg on anesthetic risks. Lumbard and Lathrop's technic for ether-oil colonic anesthesia in thyroidectomy are indicated and their results corroborated.

Throughout the volume, whenever possible, the anesthetic technic is connected with certain surgical procedures. It is of interest also that the experiments and clinical results of Waterhouse with the therapeutic use of ether in acute infections is given due prominence. This use of ether promises to be one of the outstanding advances in the control of infections and to question the dictum that etherization destroys immunity.

The After-Treatment of Operations. By P. Lockhart-Mummery, F.R.C.S. (Eng.), Senior Surgeon to St Mark's Hospital for Cancer and the Queen's Hospital for Children, London. Duodecimo, cloth, 275 pages, illustrated. *Fourth Edition.* William Wood & Co., Publishers, New York, 1916.

While Mummery's book was originally written for practitioners and house-surgeons, it is equally as valuable to the specialist in anesthesia. The day has passed when the anesthetist's work begins and ends in the operating-room. The anesthetist is rapidly becoming that member of the surgical team who is responsible for the proper preparation of the patient for the operative ordeal and for such postoperative care as will insure an uneventful recovery.

The continued popularity of Mummery's manual and the call for a *fourth edition* show that it has proved of real value to those readers for whom it was designed. In the present edition much new matter has been added and the entire context brought up to date. In particular the chapter on Surgical Shock has been entirely rewritten in the light of more recent work on this subject.

While the routine methods of after-treatment are given especial emphasis is laid on those practical details which anticipate the incidence of untoward complications.

The Internal Anatomy of the Face. By N. H. Cryer, M.D., D.D.S., Professor of Oral Surgery, University of Pennsylvania; Oral Surgeon to the Philadelphia General Hospital. *Second Edition,* Revised and Enlarged. Cloth, octavo, 300 pages and 377 engravings. Lea & Febiger, Publishers, Philadelphia and New York, 1916. Price $4.00.

Surgeons and dentists who wish to perform successful operative procedures under local or conductive anesthesia, must be skillful anatomists. Now anatomy cannot be classed among the exact sciences. The more closely the subject is studied the more variations as to details are discovered. Especially is this true of the anatomy of the human head, as it is modified by climate, race, age, disease, occupation and many other conditions.

In his book, Cryer has given the results of years of special study of the anatomy of the head and face. In pursuance of his research hundreds of sections of the facial region have been cut and examined. The lesson they teach is that the accepted descriptions are to be received as only general truths and that they cannot be depended upon or followed literally as a guide for the surgeon or dentist.

Cryer's investigations afford a basis for the explanation of the failure of many dental and surgical operations conducted along the lines of accepted anatomical description; such failures have been regarded as merely the natural percentage of unsuccessful treatment, whereas, they have probably been due to variations in the parts clearly within the limits of normality. This is thoroughly demonstrated in the present work by text and illustration.

To those surgeons and dentists who wish to improve their anatomical intuition and thereby also facilitate their technic of local and conductive anesthesia and the details of their operative procedures on the face and head, this volume of Cryer will satisfactorily answer their needs. In text and illustration the book leaves nothing to be desired. In view of the artistry of the frontispiece, the reviewer raises the question as to whether medical works as a whole should not be printed on India tint paper.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success

INTERSTATE ASSOCIATION OF ANESTHETISTS.

The Second Annual Meeting of the Interstate Association of Anesthetists was held in Louisville, Ky., July 26, 27, in conjunction with the National Dental Association. It was a success not only in point of attendance, but also in the interest and quality of the papers presented. As these papers will be published in the Supplement there is no occasion to review them now. The Joint-Session at the Gaiety Theatre with the N. D. A., in which a symposium on Anesthesia for Oral Surgery was presented, created a very favorable impression on the members of the allied professions in attendance, especially as a number of the papers were illustrated with moving picture films. These demonstrations enabled the large audience to appreciate all the details of technic as well as if each individual had been standing at the clinician's elbow.

During the Executive session the following officers were elected for the ensuing year: Chairman, Isabella C. Herb, M.D., Chicago; Vice-Chairman, E. I. McKesson, M.D., Toledo, O.; Secretary-Treasurer, F. H. McMechan, M.D., Avon Lake, O.; Executive Committee, T. J. Collier, M.D., Atlanta, Ga.; F. W. Rounds, D.D.S., Louisville, Ky.; Hugh Barr, M.D., Nashville, Tenn.; J. R. McCurdy, M.D., Pittsburgh, Pa.; Lillian Mueller, M.D., Indianapolis, Ind., and O. E. Lanphear, D.D.S., Kalamazoo, Mich. The next place of meeting was left to the discretion of the Executive Committee. It was unanimously resolved that the Association through its officers, its official journal and its individual members bring to a definite conclusion the administration of anesthetics by unlicensed persons in every state in the Middle West in which such action can be secured. It was also decided to co-operate with the Committee appointed by the American Association of Anesthetists at the Detroit Meeting to investigate and improve the methods of teaching anesthesia and of providing improved anesthetic service in hospitals and clinics. The Secretary was also empowered to investigate anesthetists' fees under the Workmen's Compensation Acts in various states and initiate action to standardize these fees and make them commensurate with the services rendered. In a discussion of the Association's welfare it was determined to add clinical and research demonstrations to future programs of the annual meetings.

The following members were admitted to membership: Drs. H. W. Barton, Akron, O.;; W. L. Shearer, Omaha, Neb.; Benj. Landy, Minneapolis, Minn.; J. P. Henahan, Cleveland, O.; John R. Worley, Dallas, Tex.; F. F. Molt, Chicago, Ill.; E. Klaus, Cleveland, O.; Mary E. Hopkins, Louisville, Ky.; R. E. Holder, Columbus, Ind.; J. W. Heim, Louisville, Ky.; P. J. Federspiel, Racine, Wis.; Arthur E. Smith, Chicago, Ill.; Louis H. Maxson, Seattle, Wash.; S. L. Silvermann, Atlanta, Ga.; Robt. R. Bosworth, Chicago, Ill.; A. Brom Allen, Chicago, Ill.; E. L. Brady, Marion, O.; Wm. H. DeFord and Jessie Ritchey DeFord, Des Moines, Iowa; Harry M. Fisher, St. Louis, Mo.; Val. H. Frederick, St. Louis, Mo.; F. L. Gruber, Columbus, O.; G. B. Winter, St. Louis, Mo.; F. C. Vandervort, Bloomington, Ill.; Emil Specht, Brooklyn, N. Y.; F. W. Rounds, Louisville, Ky.; B. Merrill Ricketts, Cincinnati, O.; Edward Remy, Jr., Mansfield, O.; Roy S. Hopkinson, Milwaukee, Wis.; Samuel Johnston, Toronto, Can.; Otto U. King, Huntington, Ind.; E. L. Moravec, Cedar Rapids, Iowa; K. R. Ruddell and L. Lockerie, Indianapolis, Ind.

The Association dinner, served in the Leather Room of the Hotel Seelbach, was a very enjoyable affair and was graced by the presence of Mrs. Taylor of Athens, Ga., one of the surviving daughters of the discoverer of etherization, Dr. Crawford W. Long, about whose discovery Dr. E. M. Magruder of Charlotteville, Va., read a most interesting paper, replete with many neglected historical facts. The toasts of the occasion by Dr. Hendon, Mr. Brower and Mrs. L. Van Varseveld McMechan were thoroughly enjoyed, as were the musical numbers rendered by Mr. Emms, and Miss Browne and the quartette composed of Mr. and Mrs. Douglas Webb, Miss Ross and Dr. North.

Dr. Sherrill, President of the Jefferson County Medical Society, wished the banquetters "good-night!" Louisville outdid itself in hospitality and the Convention League and its representative, Mr. Goode, did everything possible to make the accommodations and entertainment for the meeting a success.

SOME OBSERVATIONS ON THE ANESTHETIC AND INHIBITORY PROPERTIES OF THE MAGNESIUM SALTS.*

S. J. MELTZER, M.D.,

New York City.

I greatly appreciate the honor of your invitation to address the American Association of Anesthetists, and yet I would hesitate to avail myself of this opportunity of making Some Observations on the Anesthetic and Inhibitory Properties of the Magnesium Salts, were it not for the fact that some of our experimental researches have been put to the crucial test of clinical results with a very satisfactory measure of success.

For a number of years I have been deeply interested in the theoretical phases of the inhibitory properties of the magnesium salts. With your permission I will deal briefly with the phenomena of inhibition, as I understand them, and then proceed to discuss the inhibitory actions of the magnesium salts, which we have observed in our experimental studies at the Rockefeller Institute, and which led up to the use of magnesium sulphate in tetanus, then for anesthesia in animal research, and more recently for anesthesia in operative procedures on the human subject.

When the Weber brothers found that stimulation of the peripheral end of the vagus nerve stopped the heart in diastole by inhibiting its contractions, the phenomenon of inhibition was discovered. In the past seventy years many other physiologic processes have been discovered, which have had to be interpreted as inhibitory phenomena. You are all familiar with the fact that when accelerator and inhibitory nerve fibres are simultaneously stimulated that the inhibition may prevail during this period of stimulation or else the augmentors may predominate *during* stimulation and the inhibitors produce the longer *after-effects.* This antagonism applies not only to the motor sphere, but exists also in the functions of secretion and sensation, and furthermore, is applicable to functions in which the augmenting and inhibitory processes are not represented by well defined nerves or other morphological units.

Now by an analysis of numerous living phenomena I came to the conclusion that *all living functions are continually controlled by two opposing forces: augmentation or action on the one hand, and inhibition on the other.* The state of every function at every moment depends on the relative predominance of each of these opposing forces. Taking motion as an instance the maximum effect of the action factor in the living body is *tetanus* and the maximum inhibition is complete relaxation or *anesthesia.* The various degrees of tonus represent an intermediary state in which one or the other of the opposing forces predominates.

Under the influence of the conception that inhibition is an important factor in the functions of the living body, the question arose in my mind whether or not a definite relation existed between the magnesium ion in the body and its various states of inhibition or depression. This conception was emphasized by the experimental fact that while the effects of nearly every kind of salt consisted in the causation of more or less intense and convulsive attacks, that after an intracerebral injection of a few drops of magnesium sulphate solution the animal turned on one side and remained for hours in a stuporous condition. A review of the literature revealed that the action of the magnesium salts had been only superficially studied, as had also the phenomena of inhibition. Consequently, during the last twelve years, with Dr. John Auer and other associates, I have investigated the various actions of the magnesium salts on the animal body in the department of physiology and pharmacology of the Rockefeller Institute. After long experience I may say today that the *dominant* action of the magnesium salts on the living body, no matter how administered, consists in *depression* or *inhibition.*

When, as it was found originally by Dr. Auer and myself, after the administration of a very small amount of ether, insufficient to cause anesthesia, an inefficient amount of magnesium sulphate is injected intramuscularly, a profound anesthesia follows, which can be maintained for hours. Consciousness is the first thing which is completely abolished. The unconsciousness is, as a rule, accompanied by great muscular relaxation, while all the reflexes may still remain nearly unaffected. With a larger dose of magnesium the reflexes too begin to disappear, and with a still further increase of the magnesium dose the motor nerve endings become paralyzed—a curare-like action—which is accompanied by a simultaneous profound central action. These facts were especially confirmed in a number of operations performed by Drs. Peck and Elsberg on human beings.

Chemically calcium and magnesium are closely related substances. Biologically, however, they are strikingly antagonistic to each other. Auer and I found that an animal which had been completely paralyzed by magnesium salts, could be restored within a fraction of a minute by an intravenous injection of a calcium salt, provided the animal had only been exposed to the effect of magnesium for a comparatively short time. When the animal is saturated with magnesium for a longer period the antagonistic action of calcium is less evident and is even not without some danger.

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*Abstract of an Extemporaneous Address delivered during the Fourth Annual Meeting of the American Association of Anesthetists, Detroit, June 12, 1916.

My theoretical explanation of these phenomena is that the magnesium solution in the lymph bathing the *synaptic membrane* inhibits the passage of nervous afferent impulses from one neuron to the other, especially of such impulses for which there is less resistance to the entrance of magnesium solutions that the more solid membrane of the motor nerves and the muscle. Calcium when present in the lymph in a larger quantity than normal enters readily into the synaptic membrane and displaces or neutralizes there the obstructing or the inhibiting magnesium. When, however, the magnesium has permeated the nerve cell, the calcium is incapable of neutralizing its inhibitory action.

In view of our extended laboratory researches and the clinical use of magnesium in the treatment of tetanus in the war hospitals of Europe, I might summarize that phase of the subject as follows:

In each and every case of tetanus 1.2 cc. of a 25 per cent. solution of magnesium sulphate should be given by subcutaneous injection three to four times a day throughout the course of the disease. When the disease is complicated by severe tetanic attacks, 1 cc. of a 25 per cent. solution for every 20 pounds of body weight, in adults, should be given by the intraspinal method. When the disease is attended by immediately dangerous tetanic complications, from 2 to 3 cc. per minute of a 6 per cent. solution of magnesium sulphate should be given by intravenous injection until the dangerous symptoms subside or the respiration becomes shallow or too slow. When respiration becomes embarrassed a small amount of calcium chlorid, 2.5 per cent., should be slowly injected through the venous canula, used for the infusion of the magnesium, until respiration shows definite improvement, which may occur in 30 seconds; the calcium injection should then be immediately discontinued, otherwise all previous tetanic manifestations may make their reappearance. Also an intrapharyngeal insufflation apparatus should be at hand for use whenever the integrity of respiration becomes endangered.

With regard to the use of magnesium for anesthesia, let me say that while it has proven itself satisfactory in the limited clinical trials of Drs. Peck and Elsberg, I would deplore any effort on your part to put the method into routine practice. It is still in the experimental stage and must be used with the utmost caution. It is certainly interesting, however, that a solution of a constituent of the body introduced intravenously is capable not only of removing all sensation, but also of producing absolute unconsciousness. One of the patients operated on by Dr. Peck for a double herniotomy, remarked to me after his return to bed: "Was I operated on? I heard you talking and felt you must be doing something; but I could not move nor did I feel any pain. I did not think you had operated."

Dr. Peck did not attempt a surgical procedure under magnesium anesthesia on a human being, until after he and his anesthetist had painstakingly prepared themselves for the ordeal by animal experimentation. It may be said in passing that the human being is much more sensitive to the effects of the inhibitory properties of magnesium than the dog, although in the antidotal use of calcium chlorid we have a rapid and efficient remedy for counteracting any untoward effects of magnesium anesthesia.

One of the advantages of magnesium anesthesia is that recovery is rapid and without complications. It produces a hyperglykemia not a hyperglycosuria.

There is no fool like an old fool, and yet old and foolish as I am, I cherish the hope that our experiments will eventuate in establishing in magnesium anesthesia a safe, practical and efficient routine method of surgical narcosis. (Applause.)

ABSTRACT OF DISCUSSION.

Dr. W. D. Gatch, Indianapolis, Ind.: I am sure that I voice the extreme satisfaction of the entire Association in expressing our thanks to Dr. Meltzer for his interesting address. I recall an interesting case of magnesium poisoning during my interneship. The case was brought into the hospital in a condition of coma and the diagnosis made through the finding of crystals of magnesium sulphate in the urine. It developed that the patient had been in the habit of taking two or three ounces of magnesium sulphate every day over a long period of time. I have seen other patients whom I thought suffered from chronic magnesium sulphate poisoning from excessive, daily use of Epsom salts. I also recall a severe case of tetanus, a patient of Dr. R. Miller of Pittsburgh, who was saved by intraspinous injections of magnesium sulphate. This patient's convulsions were so severe that with his head on one chair and his feet on another, his body, otherwise unsupported, remained as rigid as an iron bar. In this case one injection of 10 cc. of a 25 per cent. solution of magnesium sulphate intraspinously, would produce complete paralysis of the body up to the diaphragm for from nine to ten hours. After being kept under the influence of the magnesium for six days the patient fully recovered. The method is a dangerous one to use routinely unless one is familiar with the action of magnesium and also the antidotal use of calcium chlorid.

In closing I believe Dr. Meltzer could add a few interesting remarks about the local analgesic action of magnesium sulphate.

Dr. J. T. Gwathmey, New York City: I should like to know the percentage, strength and amount of the solution that Dr. Meltzer used for intravenous injections.

Dr. S. J. Meltzer (closing): Regarding the local analgesic action of magnesium, I would state that we succeeded in producing analgesia in the nerves of the rabbit, experimentally, but failed in our experiments on frogs. Personally, however, I have used 25 per cent. and even stronger solution locally in first and second degree burns, over painful areas and in the treatment of erysipelas. Hare quotes an instance of local anesthesia of the entire foot from an application of a 25 per cent. solution of magnesium sulphate.

Answering Dr. Gwathmey's question, I would state that in tetanic seizures, magnesium sulphate solutions may be used intravenously in 6 per cent. solution from 2 to 3 cc. per minute, or in a 3 per cent. solution from 5 to 6 cc. per minute, but the infusion should be stopped at once if respiration becomes slow or shallow. Ten per cent. solutions may cause paralysis of the heart lasting from 2 to 3 minutes and for this complication there is no antidote. For anesthesia, however, the 6 per cent. solution is not always efficient, hence I would reiterate my caution about the use of the method until definite data have been accumulated for your guidance. The sphere of useful and the margin of safety of magnesium sulphate anesthesia may prove to be so narrow as to preclude its routine use.

It was formerly my impression that coma could not result from the ingestion of magnesium sulphate by the mouth, because of its rapid elimination by the kidneys after absorption. About two years ago, however, we found experimentally that we could readily kill animals by injecting magnesium into any part of the intestinal canal. The magnesium sulphate is chemically altered in the stomach as a rule, but if it passes into the intestines unchanged it may produce harmful results.

In view of the experimental introduction of various substances into the duodenum, it may be of interest to inform you that magnesium sulphate so introduced will relax the spincter of the common duct. This can be accomplished by the administration of magnesium through the duodenal tube and it introduces the question of the advisability of such a procedure in the presence of jaundice with pain, due to colic of the intestines from the antagonistic action of the fibres of the gall-bladder in attempting to drive out the bile and in the contraction of the common duct spincter to prevent its escape.

Newer Apparatus

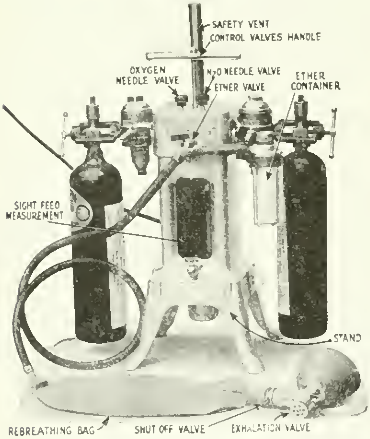
Editor's Note: From time to time this Department will publish Illustrations and Technical Details of the Newer Apparatus for Anesthesia and Analgesia.

GAS-OXYGEN ANALGESIA IN EYE, EAR, NOSE AND THROAT SURGERY.*

WILL WALTER, M.D.,
Chicago, Ill.

This paper deals with the means and technic employed in the production of *analgesia* for cases in office and bedside practice, for which we ourselves should provide painless surgery, not only to save time, effort and expense, but also to spare patients the distress incident to minor surgery and to eliminate fear and shock.

Analgesia differs from anesthesia in that patients remain quite amenable to suggestion, though they may have all their senses obtunded to the verge of unconsciousness. Dilution of gas with oxygen, varying from 10 to 50 per cent., governed by the varying susceptibility of patients, will provide any needed degree of analgesia. This ratio of gas to oxygen is reduced when preliminary medication with morphin-scopolamin is used to relax the mentally fearful patient.



In dentistry it is possible to employ any ratio of oxygen to nitrous oxid through the medium of a tight fitting nose mask and to continue its administration for analgesia indefinitely, because the patient is able to obstruct his mouth breathing by means of the tongue without interference with operation upon the teeth. The application here simulates general gas-oxygen analgesia and is the same as for all operations with which we are concerned, with the exception of work beyond the wall voluntarily brought about by the apposition of the soft palate, the tongue and the anterior pillars. Therefore our problems are the same as other problems with reference to this type of anesthesia so long as air may be excluded from respiration. But for surgery of regions behind this wall we are obliged to produce an anesthesia and to work rapidly as soon as this wall is opened and air of necessity inhaled.

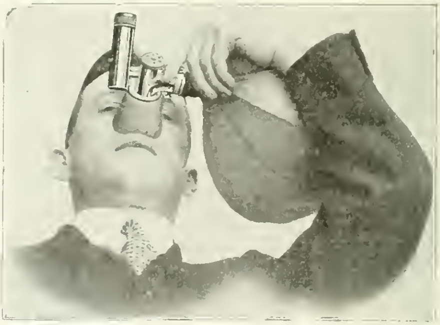
As to how we endeavor to meet this will be seen later, for while we may not produce anesthesia with the mouth open we may produce a degree of analgesia if we throw into the mouth a stream of pure nitrous oxid sufficient to minimize the amount of air in the mixture, producing a fairly good proportion for the production of analgesia.

Successful administration of analgesia requires perfectly adaptable nasal or oral inhalers; pressure-reducing valves; percentage control of the gas-oxygen mixtures; moistening and washing of the gases and warming; preferably a sight-feed for guaging the mixture of the gases; rebreathing; concomitant etherization, and finally cooperation on the part of the patient.

Analgesia is available for the following operations:

In Ophthalmology—Opening of lid abscesses, operations upon cysts, styes and small tumors. Electrolysis, painful epilations, cauterization of ulcers. Removal of stitches, removal of deep foreign bodies. Passing of lacrymal probes, slitting of canthi, expression of trachoma bodies. Repairs of traumatisms. Sewing up of lacerations, and painful applications and examinations generally. It is available for most operations upon the lid and I once used it for Ziegler's cautery operation for entropion.

In Rhinology—Incision of furuncules. Opening and curetting of abscesses and of ethmoidal cells and any painful intra-nasal work; puncture and drainage of antra, removal of polyps, post-turbinal hypertrophies, cauterizations, removal of stitches from frontal sinus operations and the passing of probes in these cases. All these operations are done using the mouthpiece and inhaler. Adenoidectomy and tonsillectomy have frequently been done in the office, employing this method. Peritonsillar abscesses are easily cared for and the patients' control over their expectoration is of great value.



In Otology—Incision of furuncules, painful probings, removal of stitches, removal of polyps, curettage of granulations, all painful dressings and applications and examinations. It is particularly valuable in paracentesis and for ossiculectomies. In first dressings after mastoid it is wonderfully comforting.

TECHNIC OF ADMINISTRATION.

The tanks are attached, after which warm water is poured in up to the marked water line. The hydrostatic safety valve is always open at the top and if water is poured through this opening it first fills the safety valve and then overflows into the mixing chamber.

For operations of twenty minutes' duration or less we depend upon the water for the heating, but for longer cases we attach the plug of the heating coil to a convenient socket.

Both needle valves are now closed and the outflow valves on the tanks are fully opened, also the one hand control valve. The pressure of gases is now at the needle valves and ready for the determination of its flow by opening these valves. The nitrous oxid needle valve is first opened to the required flow and the level is noted, after which the oxygen needle valve is set at the desired percentage. The control valve is now closed and we are ready.

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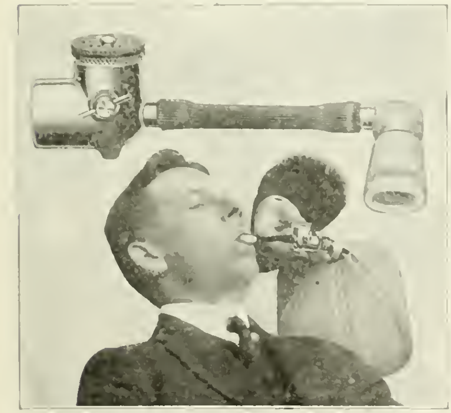
* Read before the American Academy of Ophthalmology and Oto-Laryngology, Chicago, October 5, 1915.

The proper mask is applied to the patient, mouth piece if for nose operation, nose mask if for mouth operation and the whole face mask if for general work.

The control valve is now opened and the breathing bag allowed to fill with the mixture of gases. This is accomplished by closing the outlet valve of the mask. The outlet valve is then opened, allowing to and fro breathing, and the patient is directed to inhale and is allowed to until he fails to answer questions—he is in the analgesic state. If something painful is to be done he is told to breathe more deeply and will pass into anesthesia.

For rebreathing the control valve is turned off and the outlet valve closed; or both the control valves may be opened to give partial rebreathing and partial to and fro breathing, all according to the needs to be met.

When it is desired to add ether, the ether cylinder is slipped on and ether dropped into the cup as desired. The amounts of ether and gases and the degree of rebreathing are always under control of the anesthetist and without removal of the mask.



This is the technic for all analgesia where exclusion of air is possible, full masks being employed. For operations upon the eye or nose the mouth piece is employed.

This carries only a mixing chamber with exhalation valve and bag attachment. The mouth piece is held firmly by the teeth, the lips closed over it, the apparatus being off side and out of the way. Nasal breathing being excluded by plugging we have again the exclusion of air; a dentist's rubber dam applied accomplishes this for deeper degrees of analgesia or for anesthesia when control is lost.

For operations upon tonsil or post-tonsilear areas it becomes necessary to switch from the rebreathing mask to the free flow of gas.

The technic is as follows: the *nose piece is employed* until anesthesia is well established. The apparatus being provided with direct flow under pressure from twelve pounds to a few ounces as desired, directly from the reducing valves, the gas tube is introduced into the mouth directly or through a tube carrying gag or by what is very good, a Foregger mouth piece. The direct flow is instituted, and sufficient gas is forced into the now open mouth to maintain analgesia.

The patient is able to expectorate blood if the tubes are employed rather than the gag, but it is necessary to start with gag in place since many patients shut the mouth tightly when passing into anesthesia and time is lost in forcing it open. It is difficult to voluntarily expel blood from the mouth with a gag *in situ*. Analgesia allows the patient to voluntarily expectorate and they will do so when bidden.

When employing analgesia we usually take one tonsil, allowing time for stemming hemorrhage on that side before doing the other, but it is sometimes easier to free both pillars under local anesthesia and then while in the analgesic state to do both excisions before they recover.

Our most successful routine in tonsillectomy is: *first*, preliminary hypodermic of morphine and atropin one hour before operation, dose according to age; surface anesthesia with cocaine and adrenalin; three injections of 2 per cent. novocaine and adrenalin on each side, one under the mucosa of the anterior and posterior pillars, the third in the capsule of the tonsil, the needle being introduced deeply above the tonsil. The patient is in the upright position and the tonsil is freed by sharp or blunt dissection as needed, the tonsil being held on the stretch. If the patient is nervous or hyperesthetic or is complaining we then do the same to the opposite tonsil, after which analgesia is given and both tonsils removed by snare. If the patient is not complaining gas is not used, operation being concluded upon the first side before the second is dissected. If the Sluder is done, both tonsils are taken with one analgesia if possible; more often one is taken out at a time, the second after bleeding in the first is checked.

For endolaryngeal work the continuous flow may be employed, and as it is most important here to have warmed, washed and humid gases, and low pressure, we may temporarily stop off the safety valve and thus forcibly expel the gases from the bag in any quantity or by pass flow of the gas directly.

For adenoidectomy a simple administration of gas-oxygen is all sufficient, as the operation may be done before the patient comes out of the analgesia.

The thought is prevalent that little children cannot take gas-oxygen because they have not sufficient respiratory power, but with this lower pressure apparatus and its safety attachment no trouble has been experienced. Often the child will struggle, but he will not afterwards remember that he has been subjected to traumatism.

Recovery from analgesia is a matter of two or three minutes and no untoward effects have been observed.

122 South Michigan Avenue.

Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

Alcohol Injection of the Gasserian Ganglion for Tic Doloureux, Technic of. G. M. Dorrance, Philadelphia. Pennsylvania Medical Journal, August, 1916.

Alcohol Injection Treatment of Pruritis Ani. H. B. Stone, Baltimore. Bulletin Johns Hopkins Hospital, August, 1916.

Alcohol Injections in the Treatment of Neuralgia from Cancer of the Bladder and Prostate Region. L. A. Surracco. Journal d'Urologie, October, 1915.

Alcohol Nerve Blocking to Arrest Muscular Contractions and for Neuritis after War Wounds. J. A. Sicard. Paris Medicale, May 27, 1916; and Presse Medicale, June 1, 1916.

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Anesthesia, Six Months Work in. A. Vedin, New York Medical Journal, July 29, 1916.

Anesthetics of the Future. A. H. Miller. Providence Medical Journal, July, 1916.

Anesthetization of Two Cases of Patent Ductus Arteriosus. H. R. Phillips. Lancet, June 3.

Apparatus-Vernon-Harcourt Chloroform Inhaler, 800 Cases of Anesthesia With. H. P. Fairlie. Glasgow Medical Journal, June, 1916.

Beta-Eucain Poisoning, Case of. T. G. Orr, Kansas City, Mo. Journal American Medical Association, June 10, 1916.

Blood Pressure, Technic of Measuring and Testing the Functional Capacity of the Heart and Interpreting the Findings. H. Schultess. Correspondenz-Blatt für Schweizer Aerzte, June 24, 1916.

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Carbon Monoxid Poisoning. Yandell Henderson, New Haven, Conn. Journal American Medical Association, August 19, 1916.

Chloroform and Ethyl Chlorid, Combined for General Anesthesia. J. Regnault. Progress Medical, April 20, 1916.

Chloroform, Use of in the First Stages of Labor. Isador Hill, New York City. Journal American Medical Association, August 19, 1916.

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Conductive Anesthesia. Angelo Zabriskie. New Jersey Dental Journal, May, 1916.

Death after Nitrous Oxid-Oxygen and Local Anesthesia. W. J. McCardie. British Medical Journal, July 22, 1916.

Deaths—Mortality in Abdominal Surgery. E. C. Rich, Ogden, Utah. Colorado Medicine, May, 1916.

Ether Analgesia, Early. D. P. D. Wilkie. Lancet, July 15, 1916.

Ether Anesthesia, Effects of on Electric Activity of Nerve. A. Forbes, R. McIntosh and W. Sefton, Boston. American Journal of Physiology, June, 1916.

Ether Anesthesia in Obstetrics. F. S. Kellogg, Boston. Michigan State Society Journal, June, 1916.

Ether Anesthesia, Organic Depression of Nerve Cell, Produced by. L. E. Butler, St. Louis. Journal Medical Research, July, 1916.

Ether, Formaldehyd in. E. H. Embley, Melbourne. Medical Journal of Australia, May 20, 1916.

Ether—Oil Colonic Anesthesia. L. Lambert and M. R. Hughes. Medical Journal of Australia, May 20, 1916.

Ether—Oil Colonic Anesthesia in Surgery. A. K. Evropin; also O. A. Revidtsova and Y. B. Dombrovskaia; also G. A. Garnak. Russkiy Vratch, No. xv, 12.

Handling Children with Tuberculosis of the Spine while under the Influence of an Anesthetic. Walter J. Elmer, Philadelphia. Annals of Surgery, July, 1916.

Local Anesthesia. C. C. Howard, Glasgow. Kentucky Medical Journal, June, 1916.

Local Anesthesia, Method of Facilitating Infiltration. W. Bartlett, St. Louis. Annals of Surgery, June, 1916.

Local Anesthesia in Major Surgery. O. S. Fowler, Denver. New Mexico Medical Journal, May, 1916.

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Nerve Blocking as a Practical Method of Anesthesia for Abdominal Operations. E. O. Jones, Seattle. Northwest Medicine, July, 1916.

Nitrous Oxid-Oxygen Analgesia in Obstetrics. N. S. Heaney, Chicago. Medical Record, June 3, 1916.

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RADIUM TREATMENT OF CANCER OF THE CERVIX.

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The value of radium in the treatment of cancer of the cervix is not as yet established. It is extolled by a few and condemned by many, but the vast majority in the medical profession, of this and other countries, has no settled convictions on the value of radium in therapeutics. Certain it is that radium should be given an extended trial because enough is known of its therapeutic action to justify its use in all cases in which surgery cannot be invoked. My modest contribution to the cause rests in the following abstracts of nine case reports, together with such clinical deductions as seem warranted.

The radium was administered by Dr. D. T. Quigley of Omaha, who has supplied the following notes on his methods of application:

"The radium instruments used in this series of cases are four tubes, each containing a small fraction under 16 mg. radium element, one square applicator containing approximately 16 mg. radium element and a square containing 5 mg. radium element. The squares were used on the abdomen, just above the pubic bone, as cross fire.

"The tubes used in the cervix or in the vault of the vagina were encased in ½ mm. silver.

"In cases where the wall between the vagina and rectum, or between the bladder and vagina were so thin as to make it dangerous to use the silver tubes alone, they were further encased in tubes of 1 mm. brass, and in some cases the brass was further covered with 1/3 to 1/2 inch gauze; this to get distance filtration; and the whole was covered with rubber dam.

"The squares were always covered with 1 mm. brass screens, as only very penetrating beta and gamma rays are of use here.

"In every case the most accurate approximation possible was made between the tubes and the diseased area."

When desiring to apply radium immediately after an abdominal hysterectomy, a half inch pure India rubber tubing is stitched to the vault of the vagina. The anchored end is closed with sutures and is made to protrude about one inch into the pelvis. The tube is long enough to extend beyond the vulvar outlet. The radium is attached to a stiff wire and passed the length of the tube. In this manner the radium is placed partly within the pelvis and partly in the vagina. The radium is readily removed and can be replaced in subsequent treatments with no inconvenience to the patient.

Case I. Mrs. W., age 58, no pregnancies, entered Clarkson Hospital, October 10, 1914. There was a foul vaginal discharge which later became bloody and was accompanied by pelvic pain and moderate loss of flesh.

Examination revealed an advanced cancer of the cervix and extensive infiltration of the parametrium.

Treatment. Cervix curetted, cauterized and acetone applied. Acetone applied three times in the following ten days. Two weeks later the following applications of radium were made:

Six treatments, 12 hours each 32 mg. in silver tubes, together with 20 mg. cross fire on abdomen, 1 mm. brass screen.

I examined the patient two months later and found the uterus freely movable, entire absence of exudate in the pelvis, and the vault of the vagina perfectly healed. Eighteen months later she was again seen by Dr. Quigley who reported a cancer on the posterior wall of the rectum but no evidence of recurrence in or about the uterus. The patient died of the cancerous bowel about eighteen months from the date of the first application of radium.

In this case the disappearance of the pelvic exudate, together with all local manifestations of the disease was most gratifying. It is noted that to the time of her death (about eighteen months after the first application of radium) there was no evidence of recurrence in or about the uterus.

Case II. Mrs. P., age 48, 1-para, complained of a watery discharge beginning June, 1913. Later she was distressed with pain in the vagina and left side of pelvis. No alteration in the menstrual flow. There was found a cauliflower cancer of the cervix with marked infiltration of the left broad ligament.

The cervix was curetted and cauterized and acetone applied. The acetone applications were repeated seven times at intervals of three to ten days. The discharges disappeared but the pain persisted.

November, 1914 radium was applied as follows:

Two treatments 36 hours each,
Sixteen treatments 12 hours each;
32 mg silver tube;
20 mg cross fire on abdomen.
1 mm brass screen.

In this case the large number of treatments were given because of the difficulty in controlling the pain and the repeated recurrence of the growth at the vault of the vagina.

Indeed it may be said that the radium had little control over the development of the growth in the excochleated cervix, nor did it lessen the pain. I doubt if the patient's life was prolonged or her suffering lessened by the radium. She died in uremic coma about six months after the initial application of radium.

Case III. Mrs. L., age 56, 0-para, complained of a heavy dragging sensation in the pelvis for the preceding two months and for three years antedating her admission to the hospital, she had a foul, odorous vaginal discharge. Menopause established at 42 years of age. On admission to the Clarkson Hospital, July 1915, she was found to have an advanced cancer of the cervix with extensive infiltration of the left broad ligament and uterosacral ligaments.

The crevix was curetted and cauterized and acetone applied. At the end of ten days the cellular exudate had largely disappeared and a radical abdominal hysterectomy was performed. Radium was applied at the end of operation as follows:

July 12	17 hours	32 mg
July 15	11 hours	32 mg
July 17	12 hours	32 mg
July 20	14 hours	32 mg
Total	54 hours	32 mg

Five months later the patient developed intestinal obstruction. The abdomen was opened and the entire peritoneal cavity was found invaded with carcinoma. The patient died soon after the secondary operation.

Case IV. Mrs. T., age 78, III.-para, entered the Clarkson Hospital, July 1915. For several years she had suffered from articular rheumatism and cardiac incompetency. For the six months preceding admission there had been a bloody vaginal discharge. Examination revealed far advanced cancer of the cervix. The cervix was curetted and cauterized and acetone applied. Radium was later administered in the following manner:

July 14	24 hours	32 mg
July 18	12 hours	32 mg
July 22	15 hours	32 mg
Total	15 hours	33 mg

20 mg cross fire on abdomen.
1 mm brass screen.

No improvement was observed and patient died in about three weeks, from what her attending physician called heart failure.

Case V. Mrs. H., age 46, was referred to me April 10, 1915, two weeks after amputation of the cervix. A diagnosis of cervix carcinoma had been made by two competent pathologists. A radical abdominal hysterectomy was performed and radium applied as follows:

April 17	12 hours	32 mg
April 18	10 hours	32 mg
April 28	7 hours	32 mg
April 29	14 hours	32 mg
May 10	13 hours	32 mg
Total	56 hours	32 mg

First two treatments 20 mg cross fire on abdomen.
1 mm brass screen.

The patient suffered intensely from an irritable bladder. Later she developed pulmonary embolism but slowly recovered and lived for about one year. The condition of the pelvis at time of death not known.

Case VI. Mrs. H., age 50, II-para, admitted to the Clarkson Hospital September 8, 1915, when radium was applied to a recurrent vaginal cancer. An abdominal hysterectomy had been performed some months before. Radium applied as follows:

September 8	16 hours	62 mg
September 9	16 hours	62 mg
October 22	14 hours	62 mg
October 24	18 hours	62 mg
February 26	12 hours	62 mg
February 27	28 hours	62 mg
Total	104 hours	62 mg

20 mg cross fire on abdomen.
1 mm brass screen.

Infiltration in the vaginal walls and parametrium disappeared under the influence of radium for a period of four months and then reappeared. Subsequent treatments failed to effect the growth to any noticeable degree and were abandoned.

Case VII. Mrs. B., age 50, III.-para, was admitted to Clarkson Hospital September 12, 1915. She had passed the menopause at 47 years of age. For three months she suffered from pelvic and bloody vaginal discharge. There was also cardiac decompensation and extreme anemia.

She had an early cancer of the cervix. A total abdominal hysterectomy was performed and radium applied in the following manner:

October 24	18 hours	62 mg
October 26	17 hours	62 mg
Total	35 hours	62 mg

20 mg cross fire on abdomen.
1 mm brass screen.

There was no evidence of recurrence ten months after the radium treatments.

Case VIII. Mrs. A., 55 years of age, V.-para, entered Clarkson Hospital September 20, 1915. Menopause passed at 52 years of age. Complained of pelvic pain and bloody vaginal discharge for three months. Diagnosis, cancer of cervix with no palpable extension beyond the cervix. Radical abdominal hysterectomy performed and radium applied as folows:

October 4	15 hours	62 mg
October 6	16 hours	62 mg
Total	31 hours	62 mg

Abdominal wound failed to unite. Patient died of exhaustion eleven weeks after operation.

Case IX. Miss C., age 23, 0-para, admitted to Clarkson Hospital July 13, 1915.

Diagnosis: advanced cancer of cervix.

Treatment. Initial curettage and application of acetone; 50 mg of radium were applied for a total of 84 hours at three intervals and at the end of three weeks a radical abdominal hysterectomy was performed. Following operation 50 mg radium was applied for a total of 30 hours in three intervals.

Examination at intervals disclosed no evidence of recurrence until June 1916, when patient returned with a swelling in the right iliac fosca and great pain radiating down the right leg. The abdomen was opened and a group of large glands found. A rubber tube was anchored to the margin of the abdominal incision and its distal end closed with sutures and placed to the side of the glands. 50 mg radium was carried to the bottom of the tube and left for 4 hours. These exposures with radium were repeated twice. The results are as yet unknown but it was hoped that the pressure pains might be relieved by reducing the size of the glands. The pain had not been relieved three weeks after the treatments.

CLINICAL DEDUCTIONS.

First:—It will be observed that cases III., V., and IX., which were regarded as inoperable, became frankly operable after the application of the curette, cautery and radium. In each instance no enlarged lymph nodes or infiltrated tissues were observed when hysterectomy was performed. In case IX. the scrapings from the cervix were of a highly malignant type but Dr. Schultz, the pathologist, who made careful search for cancer cells in the removed uterus, was able to find only a nest or two of degenerated epithelium. The logical conclusion is that in radium we have a most valuable agent in transforming an inoperable case into one that is operable. However, we must not imply that such cases are curable. Many of them we know are not cured and the time limit has not yet been reached for pronouncing any of them permanently cured.

Second:—Case II. was not favorably influenced by the radium. There was recurrence in the vault of the vagina very shortly after three successive applications of radium. Here, as in another instance in my experience, radium failed to destroy completely the near lying cancer cells.

Third:—In cases II., IV., VI., VIII., pain was only partly or not at all relieved by radium. In cases I., and VII., the pain was promptly relieved. In case V. the pain was intensified but was largely accounted for by an irritable bladder.

Fourth:—Cases VII., and IX. suggest the importance of applying radium on the operating table following hysterectomy. It is maintained that in so doing implantation of cancer cells at the seat of operation may be prevented. Case V. suffered intensely from an irritable bladder. She was probably overdosed. Case VIII. developed a vesicovaginal fistula which promptly healed spontaneously—she too was probably overdosed. It would seem advisable to limit the number of mg hours in postoperative cases to one-half or one-third the usual dosage.

Fifth:—The rapidity with which the general peritoneal cavity was invaded in case III. suggests that the radium might have had a stimulating effect upon the cancerous growth.

Sixth:—In cases IV. and VIII. the patients failed to react well to the radium treatments. They developed a toxic condition and it was thought that death might have been hastened by the action of the radium. Here again it is possible that she were overdosed.

Seventh:—Two of the nine patients are still living; one after a period of fourteen months, the other ten months. In one there is no evidence of recurrence and in the other (case IX.) the enlarged lymph nodes in the right iliac region, which have lately developed, are highly suggestive of recurrence.

Eighth:—Finally it is fair to conclude that radium has a place in the treatment of cancer of the cervix. It is our most effective means of relieving distressing symptoms, it prolongs life in nearly all instances, it converts many inoperable cases into operable cases, but as yet we can say nothing of the curability of these cases.

PROLAPSUS UTERI: WITH ESPECIAL REFERENCE TO THE WATKINS-WERTHEIM OPERATION.

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The term "prolapsus uteri" should be used to designate only that extreme degree of uterine descent in which the organ protrudes more or less completely from the vulvar orifice. Other and lesser degrees of descensus may be included in the term procidentia, which does not necessarily imply that protrusion has or will occur. Where the uterus occupies other abnormal positions, the deviation should be known as displacement, of which there are many varieties.

Both procidentia and prolapsus uteri, with or without complicating cystocele or rectocele, are abnormalities quite commonly observed in multiparæ. While uterine displacements are frequently encountered in nulliparæ, greater degrees of deviation are rare; yet I have recently had under observation two virgins in whom prolapsus was extreme and complicated by cystocele; the rectal structures were not involved in either case. In multiparæ there are also usually present cervical and perineal lacerations; serious injury to the levator ani muscle has oftentimes occurred; the vaginal walls may be either ruptured or inordinately elongated; the so-called "pelvic floor," which was formerly believed to constitute the sole support of the intrapelvic viscera, is therefore more or less completely destroyed. In nulliparæ of course these productive causative factors are non-existent, and the prolapsus is difficult of explanation excepting upon the doubtful hypothesis of inherent muscular and ligamentous instability.

In the first attempt to rectify uterine prolapse non-surgical measures were employed, viz., manual reposition, and in uncomplicated cases of moderate degree this was often at least partially successful, the corpus and cervix uteri temporarily remaining within the ostium vaginæ. However, the prolapse frequently recurred, particularly if the patient thereafter became pregnant, and it is well known that moderate degrees of descensus constitute no permanent bar to conception in those of child-bearing age. Obviously in complete prolapses this method of treatment was unavailing, especially where the urinary bladder and rectum participated in the protrusion. Therefore it soon became apparent that non-surgical methods were ineffectual in the treatment of both complicated and uncomplicated uterine prolapse.

The operative procedures which have been devised and practiced for the rectification of prolapsus and procidentia uteri are too numerous to be adequately described in this short paper, therefore only a few of them can be briefly outlined. It may be stated in advance, however, that prior to the development and perfection of the Watkins-Wertheim procedure, there had been suggested no method of dealing with certain of these unfortunate patients (especially where prolapse was complicated by cystocele or rectocele) that could be considered even reasonably satisfactory from the standpoint of both the patient and the surgeon.

Some of the older methods contemplated immediate excision of the protruding uterus. While, of course, this was successful in ridding the patient of the prolapsed organ, the complicating rectocele or cystocele either remained unreduced or the protrusion was increased. Removal of the corpus and cervix uteri created an additional space, which was immediately occupied by the rectal and cystic structures, thus permitting greater rectal and vesical sacculation with aggravation of preexisting discomfort.

The so-called Alexander (Alexander-Adams) operation was suggested as being more appropriate than any operation previously devised. The uterine corpus was accordingly elevated, and the supporting ligaments shortened by overlapping and suture through a celiotomy opening, in the hope that the uterus would be thereby maintained in proper position. It is interesting to note that this operation was first performed by Alquie, in 1841, but did not become popular until rediscovered by Alexander and his followers about 1882. In many instances the operation proved successful in the hands of its originators, but was inapplicable where the rectal and vesical walls participated in the descensus.

The operative procedures and modifications almost without number devised and practiced by various surgeons (Stoltz, Emmet, Martin, Murphy, Goffe, Kocher, Crile, Eastman, Freund, Schauta, Stone, Bandler, Harris, and a host of others), both ancient and modern, were also only partially satisfactory, in many instances not permanently rectifying the existing uterine deviation, especially where cystocele or rectocele was associated with the prolapsus. It must be remembered that in certain cases cervical laceration, hypertrophy or elongation may necessitate trachelorrhaphy or amputation; damage to the rectal structures,—particularly the levator ani muscle,—requires repair; perineorrhaphy and colporrhaphy must oftentimes be performed to permanently rectify the uterine descensus and its attending complications.

That the procedures briefly mentioned, some of which seemed technically perfect and theoretically ideal, failed in actual application to accomplish the desired results in complicated prolapsus uteri, indicated that the basic principle of each must be defective. The pertinent facts were apparently overlooked that (a) the so-called pelvic floor does not constitute the sole support of the intra-pelvic viscera, that (b) the uterus is normally a movable organ suspended in the pelvis by ligamentous attachments. However, broad and round ligament plication had proved unsatisfactory, in that the procedure was not only unproductive of permanent restoration of the deviated uterus, but also failed to overcome the existing and rectal complications.

The real reasons for failure attending operative methods previously in vogue for rectification of uterine prolapse are now believed to be: (a) inadequate understanding of the nature, gravity and extent of the anatomic defects and structural damage in each case, (b) failure in appreciation of the character of the operative procedures required to rectify the conditions present both at the time of the operation and which might develop subsequent thereto. In the larger percentage of these cases in reality there exists a true hernia vesicalis, which in its descent has dragged the elongated cervix uteri with it. The uterine corpus may participate in the descensus, or may practically occupy its normal position; on the other hand, there may be no cervical descent nor hypertrophy; there may or may not be a coexistent rectocele. To treat all these anatomical defects in a similar manner would certainly be a most serious surgical mistake, and careful study must be accorded existing pathology here as elsewhere before one can determine the extent and character of the operation which is most appropriate for the individual case.

As already indicated the operation devised by Watkins and Wertheim is applicable to the greatest number of complicated or uncomplicated cases of procidentia and prolapsus uteri, and by virtue of this fact has rightfully superseded practically all other surgical procedures for the class of cases under consideration. I have performed the operation many times during the last few years, and the results in nearly every instance have been satisfactory. The technique may be briefly described as follows:

The patient is prepared in the usual manner, and after being anesthetized (nitrous oxid and oxygen) is placed in the lithotomy position. Grasp the anterior cervical lip with Volsellum forceps; separate the anterior vaginal wall from the cervix by a semilunar incision; incise the anterior vaginal wall from the cervix to within an inch of the meatus urinarius in the median line, care being exercised to avoid injuring the bladder. With gauze-covered finger separate the bladder from the uterus by blunt dissection; the utero-vesical fold of peritoneum will appear as a thin, freely movable layer between the finger and the uterine body. Care must be exercised to prevent perforating the bladder with the finger. As the attachment of bladder to uterus is firmer in the median line than the sides, separation is facilitated by first working along either side. The anterior vaginal wall is now grasped at the edge of the incision with eight-inch forceps and separated from the bladder by gauze pressure. The separation should extend over the greater portion of the existing cystocele making flaps sufficiently large to cover the uterus when brought into the vagina. The peritoneum may be perforated with the finger or grasped with forceps and incised, the opening being then dilated sufficiently to permit delivery of the uterus. The uterus is then delivered into the vaginal canal by passing the finger over the fundus or broad ligament, or by grasping the fundus with bullet forceps. The anterior wall of the uterus should not be grasped and an attempt made to deliver through the peritoneal opening, as the diameters of this segment are greater than that of the fundus. A suture is now introduced through the vaginal flap near the urethra, then through the uterine body and the opposite flap at a corresponding point. The fundus should be drawn sufficiently downward to support the prolapsed bladder wall, but not to press upon the urethra and thus interfere with micturition. This suture is then tied and the required number of others inserted parallel thereto. The remaining portion of the wound is then closed. Where the cystocele is very large, a portion of the redundant vaginal flap may be excised.

The principles of the operation, as explained by Watkins, are: (1) The bladder is supported by and rests upon the posterior wall of the uterus. (2) The uterus is elevated in the pelvis by being tipped forward,—in fact, its position is changed about 180°.

The twist in the broad ligaments produced by the changed position of the uterus perceptibly shortens them. (3) The tendencies for the uterus and bladder to prolapse following the operation are antagonistic, as any sagging of the bladder increases the anterior displacement of the uterus, and any prolapse of the uterus elevates the bladder wall.

So far as can be ascertained the only objections which have been urged against the Watkins-Wertheim operation are: (1) Its employment is contraindicated, without certain modifications, during the child-bearing period because of complications which might arise during pregnancy and parturition. This objection, however, seems unimportant since extensive uterine prolapses and cystocele usually occur after the menopause. (2) The difficult technique incident thereto. This objection also seems untenable as the technique is no more difficult than that incident to other operations sufficiently radical to offer permanent correction of extensive prolapsus.

Even in complete uterine prolapse, if the uterus be not seriously diseased, a modified Watkins-Wertheim operation seems preferable to hysterectomy, as the uterus affords ideal support for the prolapsed ladder. "This modification is made by severing a portion of the base of each broad ligament from the cervix and by suture of the free ends of the broad ligaments together in front of the cervix." (Watkins).

If the operation be performed during the child-bearing period, the isthmic portions of the Fallopian tubes should be excised and the uterine ends closed by suture making a sero-serous approximation. However, where it is inadvisable to render the women sterile, the uterine body may be left free in the pelvic cavity, the anterior vaginal wall being sutured to the round ligaments and the lower surface of the uterine body. "In exceptional cases, the base of each broad ligament may be severed, and united in front of the cervix." (Watkins).

Mayo divides uterine prolapse into three groups: (1) During the child-bearing period where there is usually supravaginal hypertrophy of the cervix, the vaginal face of the cervix protruding from the vulva, the uterine body remaining in the pelvis; the resulting cystocele and rectocele are seldom of extreme degree. (2) During the age period from forty-five to fifty-five, when the child-bearing function is no longer of consequence. (3) In elderly women with advanced uterine atrophy, the uterus, cystocele, rectocele and oftentimes the entire vagina being outside the body; the cystocele is usually the most striking feature, especially in groups two and three; "it is a condition most difficult to remedy, and one which must be remedied to cure the patient." (Mayo).

The older operations for cystocele, for example those of Martin and Stoltz, have long been abandoned because the scar tissues which were formed by narrowing the vagina failed to control this phase of the pathology. "The secret of cure in all of these cases therefore lies in loosening the bladder and by some means restoring it to its position in the upper pelvis and lower abdomen." (Mayo).

I believe the majority of us will agree with Mayo in the statement that the principles of the Watkins-Wertheim operation are correct, inasmuch as the bladder is first separated from the vagina and then from the anterior wall of the uterus, thus restoring the bladder to the abdominal cavity and drawing the fundus of the uterus forward into complete anteversion with suture to the anterior vaginal wall, so that the bladder will lie within the abdominal cavity on the posterior wall of the uterus. When the bladder fills with urine it exerts upward traction instead of downward pressure.

In conclusion it seems appropriate to suggest division of the indications for operative treatment of prolapsus and procidentia uteri into three age periods: (1) In the child-bearing period; (2) In middle age; (3) In more elderly subjects.

In young women the importance of preserving the child-bearing function cannot be ignored. In such cases high cervical amputation, supplemented by the Alexander procedure and some method of perineorrhaphy having a tendency to elongate the posterior vaginal wall, should first be undertaken. In the event of failure one still has recourse to the more radical operative procedures. Mayo claims that the surgical combination will readily effect a cure in at least ninety-six per cent. of these patients.

In middle-aged women with marked cystocele where the uterus is not atrophic, the Watkins-Wertheim operation has the greatest field of usefulness. However, if the uterus be not approximately normal in size, failure may attend the operation regardless of how carefully it may be performed. In cases where cystocele is not a prominent feature, partial separation of the bladder from the uterus, with attachment of the anterior vaginal wall to the uterus beneath the bladder, may produce satisfactory results.

In elderly women where uterine atrophy has usually ensued, hysterectomy offers the best chance of permanent cure. In such cases Mayo advises his "vagino-pelvic fixation operation." He says that "the principles on which this operation depends are very simple; the vaginal wall with its attachment to the cervix lies outside the body. By removal of the uterus and usually of the ovaries and tubes, the round and broad ligaments can be secured high in the pelvic cavity, and that part of the vaginal wall which was attached to the cervix outside of the body is fixed to the round and broad ligament stumps inside the pelvis." He adds the caution that the vaginal wall should be made to surround the stumps in such manner as to furnish broad areas for union, that hysterectomy without such firm attachments only makes matters worse, since the entire vagina prolapses subsequently producing a condition exceedingly difficult to rectify.

Kocher has developed an operation for prolapsus which marsupializes the entire body of the uterus. The abdomen is opened in the median line, the uterus is drawn upward, and the peritoneum drawn about the cervix, the abdominal walls and aponeurosis being made to grasp the uterus just above the cervix. The fundus of the uterus is then implanted so that it can be felt as a rounded tumor just beneath the skin. If the patient be in the child-bearing period, the tubes are disconnected from the uterus. Two excellent modifications of this method have been produced, one by Crile and the other by Eastman. (Mayo).

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PELVIC MASSAGE IN THE TREATMENT OF POST-OPERATIVE ADHESIONS.

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It is a matter of serious import that adhesions developing after surgical procedures within the pelvic cavity of women are apt to jeopardize the good results of otherwise successful operations and in many instances create conditions so serious that more operations are required for their relief.

Considering these facts, together with the frequency of post-operative pelvic adhesions, it is rather surprising to note how little is said in American literature in reference to the treatment of this affliction. It almost seems as if the impression prevails among physicians that nothing short of surgical interference can be employed in the case of pelvic adhesions with any hope of success.

This impression, however, is not warranted. It is true that the attempts of surgeons to prevent these adhesions by carefully covering all denuded surfaces, by applying paraffin or oil during the operation, and by other precautionary measures, have not been very successful so far. Nevertheless, there are well accredited means at hand to not only measurably prevent pelvic adhesions, but also to treat them successfully, should they develop. These means are afforded by *Pelvic Massage*.

In order to thoroughly comprehend in what manner pelvic massage may be of help in solving the seemingly difficult problem, let us recall that adhesions are most likely to develop on those areas of the peritoneum that have been deprived of their epithelium. There are two ways in which the loss of protecting epithelium may happen: First, by allowing denuded surfaces to remain uncovered when closing the abdominal cavity, or by the mere handling of the pelvic organs during operation, if this handling is rough or long continued. Second, the same result is accomplished if, instead of depriving areas of their epithelium, the surface of the latter is covered with exudation, however slight, as it frequently happens in consequence of the unavoidable reaction following the operation.

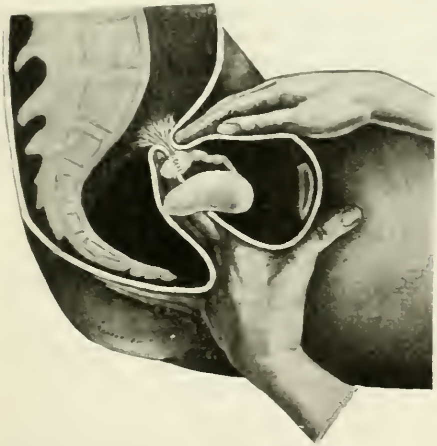

Fig. 1. The treatment by massage of adhesions between the adnexa and the pelvic walls.

In both instances the effect is the same. The opposite surfaces—first—simply glue together, but later, if allowed to remain in their approximation, they grow together in consequence of the organization and fibrous tissue formation occurring in the exudation.

From the above it becomes apparent that the development of adhesions is not necessarily the result of neglect or lack of surgical skill. They are usually the product of "chance," due to the unavoidable injury to which the tissues must be subjected, and are but the natural results of the disturbances of the circulation, the swelling and the tissue infiltration. No blame can justly fall upon the surgeon for the formation of adhesions unless he has neglected to employ during and after the operation these measures of prevention that modern science has placed at his disposal.

To these latter belong first of all massage by virtue of its very nature, its mode of application and the results achieved by it. It takes away the dangerous element of "chance," breaks up the harmful approximation of the organs and reduces in the shortest possible time existing swellings and tissue infiltrations, thus removing the very conditions which are the principle causes for the formation of adhesions.

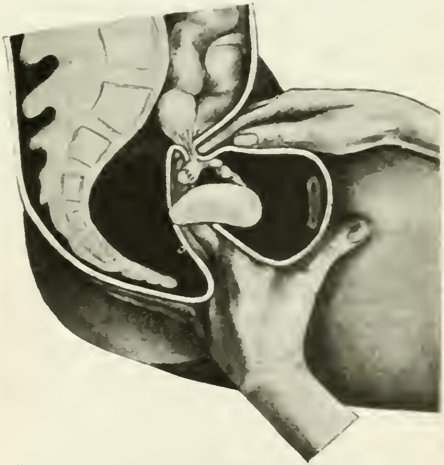

Fig. 2. The treatment by massage of adhesions between the adnexa and a loop of intestines.

The anatomical construction of the female pelvis is very favorable for the application of massage. All its organs are readily accessible, so that adhesions may be located accurately, and thus may readily be treated, if they have formed, or may be prevented from forming, if the treatment is begun early enough. Skill and experience, of course, are required. Treatments should not be applied except by a thoroughly competent physician, well versed in gynecological work, who has fingers long enough to reach with ease any part within the pelvic cavity, as explained elsewhere.* The inexperienced doctor is a dangerous masseur. If applied properly and with due caution, however, pelvic massage is a safe, reliable and effective method for the treatment of pelvic adhesions.

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*N. Y. Medical Journal, September 30, 1916, p. 639.

Danger from breaking adhesions is not present, if the work is done slowly and carefully. Many of them have yielded under my hands without causing the slightest untoward consequence. A distinct snap marks the moment when the tear occurs and it is followed by an increased movability of the organ treated.

The time when massage should be commenced cannot be stated definitely. All depends upon the extend of the operation and the reaction of the patient. Massage should never be begun at a time when there is still danger from bleeding or so long as a recrudescence of the inflammation may be feared, nor should massage be postponed until the adhesions are firm and solid. As a rule, a beginning may be safely made when the abdominal wound is securely healed.

What is said of the time to begin holds good as to the amount of massage to be applied. It should be measured out according to circumstances. Good judgment based upon sufficient experience is the safest guide. However, in order to be sure, it is well to give the first treatments in a tentative way, very light and not longer than, perhaps, a minute or two. The subsequent reactions will determine how quickly the later treatments can be pushed. The resultant pain should never be severe or lasting; and under no circumstances should another treatment be given before the reaction from the previous one has completely subsided. If these precautions are not followed, or if the treatments are given roughly and without due regard to the feelings of the patient, infinite harm may be done and the opposite be accomplished of that which is sought.

To hasten the subsidence of the reaction and to reduce as quickly as possible existing swellings or infiltrations, electricity or light treatments, especially the latter, are of decided benefit. They have proved eminently successful in my own practice.

How much may be expected from pelvic massage in the prevention and treatment of forming or newly formed adhesions can easily be deduced from the fact that even old and thoroughly tight adhesions may be stretched or broken, as the case may be. No mere tightness of adhesions is alone a bar to success. Thus, Thure Brandt, the great master of pelvic massage, succeeded in loosening by simple treatments retroflexed uteri, welded firmly to the sacrum, which the well-known Prof. B. S. Schultze, of Jena, had vainly attempted to tear off forcibly in narcosis. What Thure Brandt did in those days can be done today if the pelvic masseur is thoroughly equipped for his work and possesses the qualifications required.

With the possibilities of pelvic massage in the prevention and treatment of post-operative adhesions so obvious, it would seem the part of wisdom, as a precautionary measure, for the surgeon to make a routine examination of his gynecological patients shortly after the operation, with the same end in view that prompts the careful obstetrician to insist on an examination of the young mother shortly after the confinement, in order to detect pathological conditions at a time when they most readily yield to treatment. If surgeons as a class would adopt this common-sense measure and have pelvic massage applied in all instances in which they find undue swelling, sensitiveness or infiltration, or where, for other reasons, the formation of adhesions is expected, it would prove a long step forward in giving better and more satisfactory service to the public. However, to get the best results, a closer connection and a better cooperation than exists today between the surgeon and the expert pelvic masseur seems most desirable and is earnestly recommended.

30 N. Michigan Blvd.

CONCURRING TUMORS IN WOMEN.

Cystoma ovarii, fibromyoma uteri, and fibroma sarcomatosum pararenale.

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In connection with the life cycle and clinical behavior of tumors in general, especially with reference to the vital question of malignancy, their *comparative* study may be of considerable moment. The modifying effect of constitutional peculiarity can be eliminated by making such comparative observations on several newgrowths that happen to occur in the lifetime of a family or individual; one acting as the control tumor, so to speak, for the other. With this in mind, in the following case, the clinical data of the more commonplace, as well as those of the more interesting growths are recounted in detail.

A number of years after the removal of a tumor of the womb, the patient developed in the region of the kidney another neoplasm. At first this appeared to have all the histological characteristics of a simple, moderately cellular fibroma, but recurred subsequently as a spindle-cell sarcoma of considerable malignancy.

The *mother* of the patient was up and about at the age of seventy-six, with a large, slowly growing cystic tumor that emanated from the pelvis and filled the abdomen. Excepting this, there was no record of newgrowths elsewhere in the family. The tumor history extended over a long period of time. The menstrual bleeding was always regular and painless, not excessive in quantity, and lasted about three days, until the menopause set in, approximately at the age of fifty. Only once, at sixty-nine, slight bleeding from the generative tract occurred, and continued one or two days. About this time the abdomen enlarged visibly. Both lower extremities began to swell, and although confined to bed for ten months, the edema never entirely disappeared. The pressure from above increased the existing cystocele, so that the latter frequently had to be reduced, before the bladder could be emptied. The tumor mass increased in size during the following eight years. Pain in the abdomen and back, greater frequency in micturition, decreased appetite, constipation, all announced themselves in the past year; but, these complaints were trifling when compared with the great bulk of the growth. Besides its unequal consistency, the tumor bore the physical earmarks of an ovarian cystoma.

The history of the patient's mother, when compared with that of the patient herself, may be of significance to those who cherish the belief that it is not altogether accidental that tumors are occasionally found associated with each other in families in more or less striking groups.

According to the natural grouping of events, the tumor history of the *patient herself* may be conveniently divided into three parts. The first part comprises the history of a fibroid uterus; the second part, the advent of the pararenal tumor; the third part, the first and second reappearance of the pararenal growth after operation.

Part I.—*The fibroid uterus.* Mrs. Josephine H. (P. R. No. 1508) was born of French parents in this city. She was never seriously ill during childhood. Married at the age of twenty-three, she lived with her husband for eleven years. Ten months after her marriage twin boys were born. One baby was very small and lived only two weeks; the other, although breastfed, and initially healthy, died at four months of "summer complaint." Although the birth was normal and without sequelae excepting occasional pain in the right iliac region, she never became pregnant again.

With reference to later developments more pertinent information can be obtained from a critical review of the patient's menstrual record.

After the twelfth year, when the age of puberty was reached, the menstrual period recurred regularly every fourth week. Since the patient had always been subject to headaches even before puberty, no particular significance was attached to their inconstant occurrence either immediately before or after the menstruation. With the exception of headaches occasionally, there was nothing which could be attributed to exaggerated catamenial molimina; nor was there any pathological discharge. The menstruation was painless, and the period physiological, except in this, that the flow which accompanied it was always somewhat increased—habitual menorrhagia. During four days, at least four napkins would be saturated with blood daily, while on the fifth day the flow began to subside. Marriage and the intercurrent confinement effected no change in its general character. After confinement the usual flow returned within six weeks and continued to reappear according to its former four-weekly type. At the same time, the patient nursed her baby and lactation was unimpaired.

Although it may occur as a family trait, and there is no evidence that there exists any direct *causal* relation; it is known that in one definite group of cases, *habitual menorrhagia* is the forerunner of fibroid growths of the womb. The actual beginning of trouble in the pelvic region was reflected later, in the *progressive increase* in the menstrual flow that became noticeable at the age of 38. From this time on, the menstrual bleeding, besides increasing in quantity, as many as seven napkins being required daily, also became more protracted, lasting six days and longer.

With all, there was no trace of bleeding, outside of the menstrual time. There was not the metrorrhagia which occurs in any process entailing surface destruction of the endometrium, as is the case, for example, in the ulceration which accompanies cancerous growths of the womb.

About this time—at the age of thirty-eight—the patient had an attack of pelvic pain, which appeared to be due to some local pelvic inflammation. Two years elapsed before she reported to her family physician Dr. E. Kingsbury Ross, who correctly interpreted the condition as incident to a fibroid uterus.

The anemia, secondary to uterine bleeding was never very pronounced; with seventy per centum hemoglobin, there was some anisocytosis and polychromatophilia. Coincident with a pre-operative temperature elevation of 100.4° F. per rectum, the white cell differential count was also slightly disturbed:—

Polymorphnuclear neutrophiles	77%
Eosinophiles	2%
Basophiles	0%
Transitional cells	4%
Lymphocytes	17%

From the urine analysis, the frequency of micturition complained of by the patient, was not due to an actual cystitis, but reflex in origin. The bladder was kept in an irritable state by ingoing impulses set up by the pressure of the tumor in its intimate relation with it—impulses transmitted along spinal fibres, most of which are incorporated in the inferior hypogastric plexus of nerves.

As far as the kidney itself is concerned, it should be stated, that routine urine examination was reported, but search for casts in a centrifugalized specimen by special methods, as well as blood pressure readings were wanting. In general, on physical examination the respiratory, the digestive, the circulatory systems revealed no gross lesions.

Operation (June 17, 1908) confirmed the diagnosis of fibroid uterus of moderate size; the pus-distended tube on the right side was apparently due to a secondary infection, and probably gave rise to the attacks of pelvic pain in the course of its development.

After disposing of the pyosalpinx by immediate removal, in order to guard against spilling its contents later in the course of operation; supravaginal hysterectomy was added, together with the excision of the other tube and ovary.

After operation, the patient had four abortive menstrual periods; and then, all manifestations of the menstrual function ceased entirely. Each period was ushered in by lassitude; dark rings below the eyes. Mild menstrual molimina lasted for two days, but there was neither menstrual bleeding, nor menstrual discharge.

Revision of the pelvic status six years after operation corroborated the pathologist's finding that the growth was really a simple fibromyoma and had no malignant tendencies. The cervical stump was freely movable; there was no mass, no infiltration in the fornices. As the result of involution, complete atresia of the cervical canal had taken place; only a small dimple marking the site of the external os. The abdominal scar was soft and pliable, and faintly pigmented, not more than might be expected in an individual of distinct brunette type.

Examination of the structure removed at operation showed that the tumor was largely a solitary one, well encapsulated, spheroidal in shape, measuring 2½ inches in diameter, intramural in location involving principally the anterior wall of the uterus, above the level of the peritoneal reflection upon the bladder (Figure 1). These findings together with the existence of a pyosalpinx on the right side, tallied with the patient's symptomatology.

Dr. Jacob Diner and the late Dr. Chas. Z. Garside examined sections from the tumor, with and without Weigert's method of staining, and showed the neoplasm to be a typical fibromyoma, consisting largely of fibrous tissue with but few smooth muscle cells.

If it is approximately correct, to assume that the appearance of a *progressively increasing* menstrual flow, marks the time when active growth of the tumor began; the tumor must have required at least two years, to reach its present size. This estimate would make its rate of growth comparatively slow, which is characteristic of the usual fibroid tumors of the womb; and goes hand in hand with their benignity. This behavior will be found to be in striking contrast to that of the pararenal newgrowth which is subsequently to be considered.

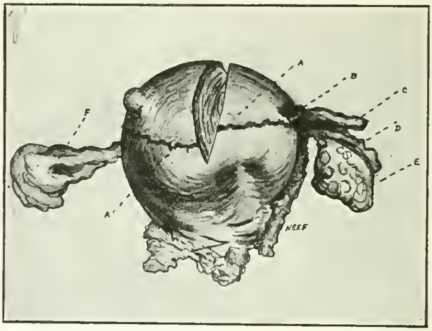

Fig. 1. Anterior view of fibroid uterus. AA—A solitary tumor involving the anterior wall of the womb above the level of the utero-vesical fold. B—Stump of left round ligament. C—Left tube. D-E—Broad ligament and ovary. F—Right sided pyosalpinx.

Embryologically a relationship between the location of this and subsequent tumors is not apparent, since the kidney originates from the *posterior* part of the segmental organ, the metanephros; while the womb, is developed from the middle portion of Müller's ducts, which are originally in relation to the pronephros, the anterior part of the segmental organ. In this connection the fact however might be recalled, that anomalies involving the female generative tract are usually unilateral; and in such instances, the kidney on the *same* side may sometimes also be implicated. If inclusions of embryonal cell groups may be classed as microscopic anomalies of developmental origin, such conditions might occur, for example, in one kidney, as well as in the corresponding side of the womb; and, give rise to tumors in one or both organs, later in life, under the influence of the tumor-inciting agent or cause, whatever it be.

Part II.—*Pararenal tumor.* The patient weighed but 87 lbs. after the first operation; and, recovered slowly, from the effect of the drain of tumor growth, exsanguination and fever, reached a weight of 100 lbs. in the course of one year, remaining at this level for another year. The improvement in her physical condition became quite apparent, although her maximum weight of 110 lbs. was at no time regained.

Two years after operation, pain which radiated upward in the back, and forward towards the navel, began to be felt in the left lumbar region. The pain increased in walking. Subsequently the sensation of weight led the patient to discover a mass in the left side of her abdomen, which enlarged slowly at first, but during the last six months before surgical intervention, increased more rapidly in bulk. If it may be assumed clinically, that the active tumor development began no later than the radiating pain in the lumbar region; then, the period of tumor-growth before operation was, at least, twenty-one months. During this time, the mass reached the size of an adult's head. Approximately speaking, therefore, the *rate of growth* of the tumor was about *one-half* that of the "normal tumor of pregnancy."

Coincidently, there was no disturbance in the functions of the stomach, large bowel or spleen. There were no symptoms referable to the urinary organs, excepting a slightly increased frequency in micturition. The patient suffered from headaches of the same general character as always—the headaches appearing about 6 A. M. on arising, lasted until about 11 A. M. The routine urine examination revealed no kidney lesion. Albumen, sugar and casts were absent; red cells, pus cells, and kidney epithelium also: the only cells were vulvo-vaginal, and these few in number. The total quantity of urine was ample; the urea content 2.4%.

The blood examination showed 85% hemoglobin and the following white cell differential count:

Polymorphnuclear neutrophiles	82%
Eosinophiles	0%
Basophiles	2%
Large lymphocytes	3%
Small lymphocytes	13%

The highest temperature per rectum recorded before operation was 100° F. The patient was, as always, the slender vivaceous woman; but there were unusually dark rings about her eyes, due to worry and lack of sleep on account of the growing mass. The tongue was clean, but the appetite slight. The pulse was rather slow, the individual beats appeared somewhat hard and accentuated to the counting finger.

A large, vertically ovoid mass with a deep notch, directed downward and mesially toward the umbilicus, occupied the upper portion of the abdomen on the left side. The mass moved with respiration, beneath the palpating hand; its surface was relatively smooth; it was solid or semi-elastic in consistency, and not tender. There was no increased dulness upward in the splenic region, when the patient was placed in the right latero-prone position, with the left arm immediately overhead. While examining in the anterior axillary vertical, the lower border of the spleen, although rather indefinitely palpable, seemed independent and in front of the upper pole of the tumor mass. Vaginal examination disclosed no connection with the pelvis. The cervical stump was freely movable in all directions, and traction could be exerted on it without disturbing the tumor. Unquestionably the mass was in relation to the left kidney, its exact relation and nature remained undetermined. To the sides of the tumor the abdomen was soft, not distended. There were no visible peristalsis, no ascites in the flanks, and, the iliac lymphnodes were not enlarged

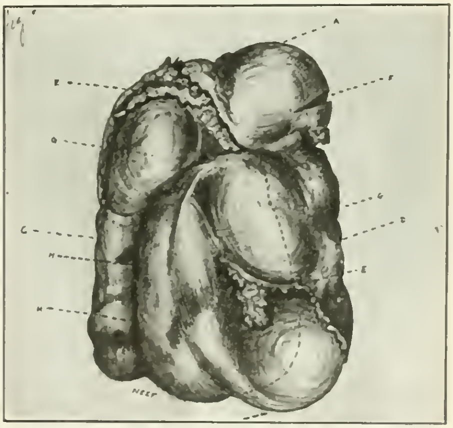

Fig. II Antero-mesial aspect of the original Pararenal growth. A—Upper Pole in relation to the diaphragm. B—Base of Tumor C—Postero-mesial border. D—Anterior border in relation to colon descendens. EE—Torn fibrous capsule. F—Site from which one of the sections was taken GG—Spheroid masses. HH—Cleft between lobes of the bilobate tumor mass and site of contact with the left kidney

Nearly four years had elapsed since her pelvic operation, when the patient underwent lumbar section for the renal newgrowth (March 26, 1912). Sufficient working room for the freeing and delivery of the tumor *en masse*, through von Bergmann's oblique lumbar incision, was obtained by placing the patient on her right side with both arms forward, with the body well flexed over an Edebohl kidney cushion. The incision was carried from the angle between the XII rib and lumbospinal muscle, from a point about ½ to 1 inch below the rib and approximately parallel to it, in the direction of the anterior superior spine of the ilium, and ended about 1 inch above it. As the incision was deepened through the muscles and fasciae, the pararenal fat prolapsed into the wound; on its division, the pinkish white tumor lay exposed in the field. Its surface was semi-elastic to the touch, but its consistency was not uniform on deeper palpation. The tumor in vivo, seemed made up of more or less spherical masses of denser tissue, surrounded by a softer encasement. The impression was not altogether unlike that received on palpating certain larger fibroid growths of the womb before chilling and post-mortem changes have taken place. The exploratory needle corroborated the opinion that the mass was solid throughout, and not cystic or cavernous; the harder centres were as difficult to penetrate, as a fibroid nodule of average density.

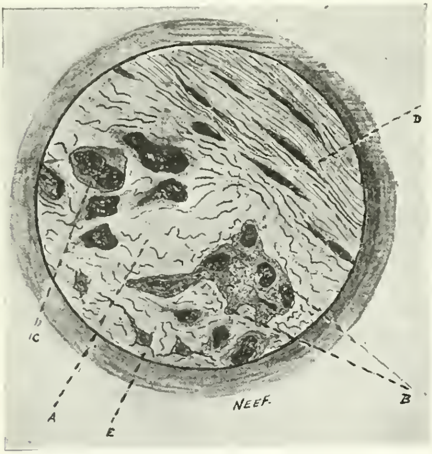

Fig. III. Pararenal Tumor. Anomalous Area, in section from the parent tumor. High power (Reichert; objective No. 7, ocular No. 4.) A—Homogeneous stroma with ill-defined fibrils. B—Cells conglomerate consisting of connective tissue nuclei undergoing karyolysis and causing the cytoplasm to stain slightly basophilic. C—Rather large, irregular types of connective tissue cells. D—Fibrillar connective tissue of loose texture due to oedema. E—Tissue having a myxomatous appearance.

The lower pole, then the posterior and anterior aspects of the tumor, were successively separated from the enveloping fatty and other structures. With the exception of a small rent that occurred into the peritoneum while mobilizing the lower pole of the tumor, and which had to be closed, the entire procedure was extraperitoneal. Anteriorly the descending colon had to be liberated; posteriorly, the convex border of the left kidney came to view, entirely distinct from the tumor, but closely applied to its concavity, anterolaterally.

The tumor could be stripped away from the kidney together with the remains of the fibrous capsule of the latter, without more gross injury to the kidney than occurs in separating the fibrous capsule, when decortication is done. The size, contour, color, consistency of the exposed kidney showed at once that its parenchyma had not been involved in the tumor formation. It was therefore decided to leave the organ intact, instead of removing it with the growth. In fact, it was not the plane of cleavage between tumor and kidney, but rather that between the upper pole of the tumor and the vault of the diaphragm, which was the more difficult to find, chiefly on account of the relative inaccessibility, the depth of the working space, and the unyielding ribs which bound it, and which were not removed; and because, care had to be taken not to enter the pleura by false dissection. From the technical encumbrance, the incorrect conclusion was drawn at the time, that if the growth, after all, really proved to be malignant, a recurrence might be expected to start from this point.

During all these manipulations there was very little hemorrhage, and the pulse ranged from 64 to 96 throughout; perhaps because all unnecessary traction on the kidney pedicle was carefully avoided. In this connection it should be stated that the anesthesia was a morphine-anæsthol sequence with ether feeding, which is usually characterized by a somewhat slower pulse rate, than when ether alone is administered.

The total quantity of urine voided during the first and second days after operation was thirty-five ounces; thirty-five or thirty-six ounces on the third day; forty ounces on the fourth. In other words, the stripping of the kidney from the tumor had no more inhibiting effects on the quantity of urine voided after operation than is the case in operations in general, elsewhere.

The tumor itself had been examined by Dr. F. C. Wood and Dr. G. L. Rohdenburg of the Cancer Research Fund of Columbia University, and Dr. Chas. Z. Garside and Dr. Jacob Diner of Fordham University School of Medicine, all of whom agreed that the sections presented no evidence of malignancy, and considered the growth as having the histological characteristics of a *simple fibroma* of *moderately cellular type*. (See also Figure 6.) This was in accord with my impression at the time, that the tumor was too well circumscribed, and too easily removable, to have been a sarcoma.

The growth was bilobate, consisting of two larger oblong lobes, separated by an obliquely vertical furrow, and surmounted by a smaller ovoid mass at its superior pole (Fig. 2.) In general the postero-lateral aspect of the mass was convex, and it was here that the main furrow traversed it. The antero-mesial side was in relation to the kidney and colon descendens. A concavity indicated the area of kidney contact. From the superior pole to its base, the tumor measured 25 centimeters; 15.5 cm. by 9 cm. representing the diameters at its greatest girth. (See Figure 2).

The findings in microscopic sections from various parts of the tumor were the following:

A. Sections of the original pararenal tumor where it was stripped from the kidney; that is, sections taken from the concavity on the anteromesial aspect of the tumor.

(*a*) A thin strip of the kidney cortex with glomeruli, a few glomeruli having undergone complete hyaline change.

(*b*) Spheroidal cell infiltration about some of the veins.

(*c*) An excess of fibrous connective tissue as the capsule of the kidney is approached; the picture was that of moderate fibrosis of the kidney cortex as in interstitial nephritis.

(*d*) The thin layer of smooth muscle which normally exists in the capsule could be traced in an unbroken line and showed that the kidney substance was not invaded by the tumor.

(*e*) Beyond it, and in close relation to the muscle plane were the larger veins of the capsule filled with red cells.

(*f*) The fibrous capsule merged into a loose, faintly fibrillar hyperplastic connective tissue, rich in nuclei varying considerably in size, and well supplied with capillary blood vessels.

B. Sections of deeper portions of the original pararenal tumor taken from its superior "subdiaphragmatic" pole showed, what appeared to be histologically, a *moderately cellular fibroma.*

C. Sections from the white and hard area on the postero-lateral convex aspect of the tumor.

(*a*) The general arrangement is not in whorls, but in long parallel lines. This impression is intensified by the hematoxylin-eosin stain which sharply outlines numberless capillary blood vessels in this region all having a similar course.

(*b*) Bundles of denser fibrous connective tissue run side by side. The relation of stroma to cells may be expressed by the ratio 5 to 1, that is, the average *cell-interval* which is occupied by stroma, is five cell diameters.

(*c*) In another zone there were sections of large vessels, the connective tissue cells were more abundant, the fibrous tissue between them was not well developed and the general structure more irregular.

(*d*) Bordering this the tissue became very loose in texture resembling myxoma. Many stellate cells with dainty processes and a few short curled fibrils in the wide interspaces between them. Only in a few parts there was indicated the diffuse blueish stain which is characteristic of myxomatous change.

(*e*) In this precinct were several small patches of infiltration by spheroidal cells.

D. Sections from the darker and softer area on the postero-lateral, convex aspect of the tumor.

(*a*) The texture, in general, was loose, and bore a semblance to myxomatous tissue. Capillaries were very numerous. The nuclei abundant, stained intensely basophile and varied notably in size. There were several small hemorrhages.

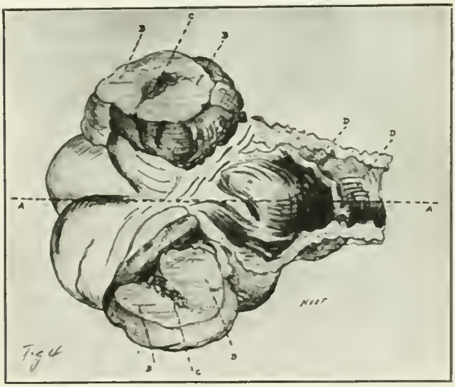

Fig. IV. Pedunculated recurrence of the pararenal growth. AA—Long axis of tumor which has been laid open, B, B, B, B representing the cut surface; C, C central softening and liquefaction. DD—Stem of cartilaginous hardness.

(*b*) In a few places the interstitial tissue was wavy and fibrillar, in others it was changed or degenerated into more or less homogeneous bands which stained unevenly with eosin, and presented a somewhat fragmented appearance.

(*c*) In several instances active cell proliferation involved the coats of small blood vessels (arteries) so that the circles of deeply stained nuclei might have been mistaken for cross sections of gland tubules. In others, little more than a series of concentric layers, staining unevenly with eosin, is all that remains to indicate the original blood vessel. In some of these the lumen is much contracted, or has disappeared, so that indeed, they resemble cross or oblique sections of bundles of degenerated muscle fibre somewhat. Such sections stand out prominently from the otherwise scanty stroma which is speckled with deeply stained nuclei, and figured with innumerable branching capillary vessels.

(*d*) There were several cell conglomerates, consisting of connective tissue cells undergoing division and karyolysis—irritation giant cells; also other large connective tissue cells of distinctly irregular type in form and staining of the nucleus. These cells were found distributed chiefly to those parts of the section which were edematous and presented a myxomatous appearance. (See Figure 3.)

Part III. *The first and second reappearance of the pararenal growth.* The mass which was palpated two weeks after operation, and at first thought to be the lower pole of the left kidney which might have remained somewhat dislocated since the recent removal of the tumor, now (Oct. 3, 1913) descended as low as the level of the umblicus with each respiration. The transverse measurement of the mass was in fact still no greater than that of a kidney surrounded by considerable postoperative thickening.

On June 19, 1914, the mass on the left side of the abdomen on deep breathing reached as low as a line connecting the umbilicus with the left anterior superior spine, and measured 2½ inches in transverse diameter, reaching the midline towards the right. It was freely movable in a lateral and antero-posterior direction; solid, and not tender. A smaller lobe projected from its *lateral* aspect. The anterior surface of the mass lay about one inch away from the costal arch, and the lower border of the spleen (?) could be outlined indefinitely between it and the ribs. Percussion of the spleen showed with certainty, no elevation of splenic dulness along the axillary vertical—it measured 2½ inches in the anterior axillary line. If the tumor were connected with the spleen, that organ should show an increase of dulness upward. Kidney percussion in the lumbar region while the patient lay on her abdomen, showed the *upper* border of both kidneys to be at about the normal level; but while on the sound side there was bowel tympany almost immediately below; there was a continuation of the dulness downward as far as the iliac crest on the affected side. Elevating the XI rib from the table on the right side, lifted the tumor forward, so that it became visibly and palpably more prominent in the left half of the abdomen at the level of the umbilicus. There were no enlarged lymph nodes in the groin. Liver percussion was normal. Excepting the median suprapubic, and oblique, left-sided scars of the former operations, the abdominal findings were negative. On vaginal examination the stump of the cervix was freely movable anteriorly, posteriorly and vertically, and looked healthy on the speculum examination. There was complete postoperative atresia at the external os, so that it would not admit a sound. The pigmentation of the labia minora was not unusual.

The patient was exceptionally well preserved for her age, which was then 45; her general appearance better than ever. Her only complaints, and these were not very emphatic, were, besides headaches, some nervousness, and occasionally constipation which was easily relieved. The temperature was normal. The pulse was characteristically slow, it rated from 52 to 55 for one minute; the heart beat showed the same frequency. The quality of the pulse was not notably changed. No murmurs could be heard over the precordium.

Record of the quantity of urine voided by the patient in 24 hours:

June 19 to 20...............	1½ pints
" 20 " 21...............	2½ "
" 21 " 22...............	2½ "

Therefore, a daily average, of about 35 ounces which is approximately the normal quantity for women. Analysis of the urine:—rather pale, clear, amber colored urine of very faintly alkaline reaction, and specific gravity of less than 1,025; no albumen present; microscopical examination of the sediment, negative. The patient's blood contained 80% hemoglobin.

After an interval of about two years, the patient underwent a third operation (June 29, 1914). The removal of the tumor was attempted through an oblique lumbar incision with excision of the scar of the previous operation. It was noteworthy, that the recurrence did not appear at the upper pole of the kidney, beneath the vault of the diaphragm, where the separation of the original tumor had proven most difficult at the time. Instead, it evidently sprang from the region of the hilus of the kidney, and its base of cartilaginous hardness, was intimately adherent, not only to the vessels and structures of the kidney pedicle, but also to the *immediate neighborhood*. From its point of origin near the hilus and vicinity, it had grown in a mesiocaudad direction, but the advancing portion of the tumor nowhere became adherent to the structures it displaced, and could be moved freely from side to side. It was evident, however, that the deep attachment of the recurrence was such, that its radical removal was technically impossible whether the kidney itself was included in the procedure or not; and separation of the growth, as close as possible to vital structures at its base, was all that could be reasonably attempted. On account of diffuse venous bleeding from the deep tumor bed, a part of the wound had to be left open and the bleeding controlled by tamponade with sterile gauze.

The entire tumor measured six inches (15 cm) in length, and four inches (10 cm) in its greatest diameter. The body of the growth was irregularly ovoid, and its surface tuberous. In vivo, spheroid solid masses were palpable in a softer stroma; in this, it resembled the parent tumor. The attached portion, or stem of the growth was very dense and hard; its surface irregular, and raised in small projections. On section in the unaltered state, the body of the growth had a yellowish color, and looked but slightly vascular to the unaided eye. Some of the globular masses showed central softening or liquefaction. The stem of the growth was dense and gritty, and rather difficult to cut. (Figure 4.)

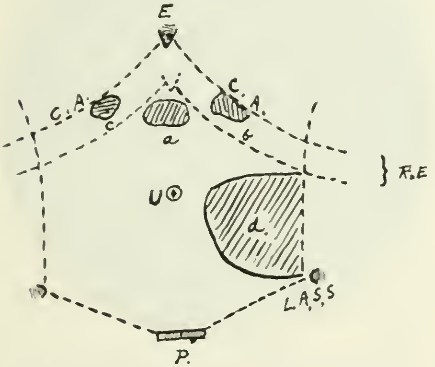

Fig V. Diagram of findings: E—Ensiform cartilage. CA—Costal arch. U—Umbilicus. LASS—Anterior superior spine of ilium, left side. P—Pubic crest. RE—Respiratory excursion of costal arch. At a, b, c, are metastatic deposits in the epigastrium; the first indication of metastases in this case; d, main tumor mass.

Sections were taken from the stem, and from the body of the recurrence for microscopical study.

A. Sections from the *stem* of the tumor consisted mainly of coarse, wavy strands of degenerating fibrillar connective tissue staining unevenly with eosin. Interspersed were anomalous cells with large irregular clump-like, deeply staining nuclei. These were probably of connective tissue origin. A few were of the giant-cell type, probably resulting from nuclear division without separation of the protoplasm. The abundance of coarse, fibrous tissue in the make-up of this portion of the tumor in proportion to the tumor cells, explains its relative hardness. In some parts, however, the effect of oedema was evident, and the structure was looser and less regular; but, fundamentally the same elements were present.

B. Sections from the *body* of the recurrence differed macroscopically, quite noticeable from the preceding, in the decidedly blue color imparted to the specimen by the great number of hematoxylin stained nuclei present. Microscopically, *sarcoma cells of the small spindle cell variety* were closely packed together in thick planes, which either lay parallel, or crossed each other obliquely at various angles (Figure 7.) Most of the cell nuclei were fairly regular, round in cross section, 4 to 6 times as long as they were broad, slightly tapered at the ends, and intensely basophilic. The most active tumor cell proliferation took place about blood vessels. There were also large irregular strips of tumor necrosis interposed. From some of these, the nuclei had entirely disappeared, and there remained only an acidophile debris which stained feebly with eosin. There was the same proliferation of cells in the walls of some of the blood vessels, as previously pointed out. In other places, the initial activity seemed to be followed by regressive changes in the vessel walls. This process appeared to antidate or coincided with the degeneration and necrosis of portions of the newgrowth.

There was nothing unusual in the patient's condition immediately after operation, except that the nausea and vomiting, while not excessive, were a little more marked than in the average case. On the evening of the day following operation, the patient was found snoring heavily, and on attempting to arouse her, she passed into a state of great excitement—acute delerium—during which she complained of agonizing pain in her left hypochondrium, and made violent efforts to get out of bed. Her mind was clouded at first, but gradually this condition improved, and the patient recognized those in attendance. With morphine sulphate gr. ¼ given hypodermatically, cool nuchal packs, and an ice-cap to the head, she lapsed into a quiet sleep. During this seizure, the pupils were normal; the face showed a high color. The quantity of urine voided was sufficient. The temperature remained below 101° F. per rectum; the pulse was good and not rapid; the epigastrium soft; there was no dificiency in the water intake; it was therefore difficult to account for this transitory cerebral manifestation which never repeated itself again.

It was scarcely a month and a half after the removal of the returning growth, that there could be felt in the left hypochondrium a smooth mass 1½ inches in diameter, shifting with repiration and manifestly connected with the left kidney. At the time the lower end of the mass was about one inch above the umbilical level. The patient's weight was ninety-three pounds. The urine pale, straw colored, clear, feebly alkaline in reaction, and contained neither albumen nor sugar; microscopic examination revealed nothing abnormal.

The weight remained ninety-three pounds, then rose to ninety-six and a half pounds, one hundred pounds, one hundred and six pounds, during successive months. These four months of improvement, were succeeded by two, during which the patient felt that she was getting more nervous, and suffered more constantly than ever before, in fact almost daily, from matutinal headaches. There were added some nausea and stomach upset, and the appetite was slight, but nevertheless her weight continued to be about one hundred and four pounds. The pulse was 72, the temperature normal. The tongue slightly coated, which tallied with the history of stomach upset.

The recurring growth projected from 2½ to 3½ below the top of the IX rib, changing its level with respiration. It measured about 3 inches from side to side and 3 inches anteroposteriorly. Its surface was irregularly round, and appeared to be loosely anchored in the path of the old scar. The scar remaining after the two preceding operations on the pararenal growth, was 8 inches long, beginning at the angle between the lowest rib on the left side, and the erector spinae muscles, and ending about 1 inch in front of the anterior superior spine of the ilium; it was somewhat pigmented but soft, and indicated satisfactory healing. There was no evidence in it, of recurrence. The mass was evidently connected with the kidney, which probably lay above it. The lower border of the spleen was palpable in front of it, beneath the costal arch, and the splenic dulness measured about 2½ inches in the axillary vertical. The patient led, as ever, a regular life, with sufficient bodily activity, air and sleep. Subjectively and objectively speaking, there was even then no outward sign of serious physical decline.

On March 1, 1915, it was noted that there had been a loss of weight during the past two months. In the last three weeks the patient experienced some discomfort in the left half of the abdomen; and recently twinges of pain in the groin, together with a sensation of dragging in the side. During the past week, on account of an attack of influenza nostras, which was at this time epidemic in the city, the patient suffered from headaches of such severity, that she had to remain in bed under the care of her family physician; there was considerable pain in the left lower quadrant of the abdomen, and the bowel was sluggish. At the examination, the temperature was slightly elevated, being 100.4° F per os, with a pulse rate of 104. A small mass could be outlined in the linea alba, midway between the ensiform cartilage and umbilicus (Figure 5). A second mass was found beneath the left rectus abdominis muscle just below the costal arch. The tumor proper reached to the level of the anterior superior spine of the ilium, in the left flank, and appeared to be rather sensitive. It may be, that this sensitiveness was referable to the general hyperaesthesia produced by the complicating illness, in addition to the undue distension of the descending colon with gas.

Was the mass in the epigastrium connected with the transverse colon or omentum, or did it involve the stomach or liver? The transverse colon and omentum, were believed to be on a somewhat lower level. The epigastric mass moved up and down with breathing. It escaped from the fingers with a pull, when only slight pressure was exerted upon it; with firmer pressure it remained stationary, together with the organ to which it was attached. From this behavior, it was more likely that it was connected with the stomach than with the liver.

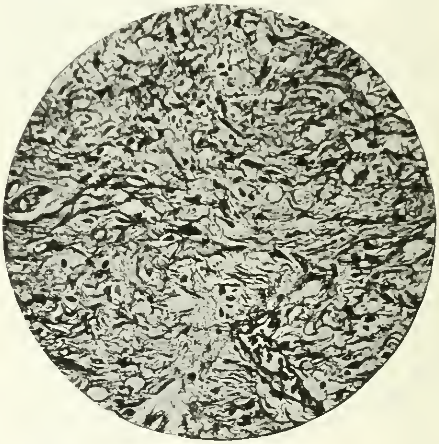
Fig. VI. Edematous fibroma. Section from the parent growth (Pararenal Tumor). Microphotograph.

The *main* mass was palpable in the lumbar region from behind, and extended down to the iliac bone, pushing the descending colon anteriorly so that the latter, when distended with gas, bulged close to the anterior superior spine. The encroachment by the tumor may be responsible for the gas-pain, as well as the relative obstruction in this region. At any rate, there was less discomfort in the side, after the bowel again moved in a satisfactory manner.

The patient's appetite was slight; the anorexia not fluctuating but progressive. This also pointed to a real complicity of the stomach in the case. The food and drink taken in twenty-four hours on three successive days was as follows:

Sunday........	2 pints of water.
	2 cups of chicken soup.
	½ pound of peaches.
	1 slice of bread.
Monday........	1 pint of water.
	1 cup of light coffee.
	1 egg.
	1 slice of bread.
Tuesday.......	2 cups of tea.
	1 cup of chicken soup.
	1 cup of clam broth.
	½ pint of iced cream.
	1 egg.
	½ slice of bread.

This small intake of food and drink together with some pyrexia and sweating, explained why, at this time, the patient voided daily only from one-half to one pint of concentrated urine which yielded a heavy deposit of urates. The diminution in quantity did not mean that there was a compression or obstruction of the ureter, nor an actual suppression of urine due to pressure of the tumor. The cystoscopic examination (March 23, 1915) disclosed a bladder of healthy appearance. The urine was clear, the mouths of both ureters were normal. Both kidneys secreted. The urine contained no albumen. The quantity of urine in twenty-four hours was scanty and averaged about sixteen ounces daily.

Nausea has troubled the patient during the past three weeks; recently, vomiting has set in. The middle of the three nodules in the epigastrium reached the size of a hen's egg; the tumor proper grew rapidly. The rectal temperature was 101° F. The patient's condition was fast getting worse on account of the increasing inanition. During the past four days a considerable quantity of fluid was supplied by the rectal drip.

Yielding to the exhortation of the family that another effort should be made to determine finally if anything more could be done by surgical means to help the unfortunate sufferer, an exploration was undertaken (March 30, 1915) through a transverse transperitoneal incision beginning just below the umbilicus in order to escape the round ligament of the liver, and sweeping toward the left flank until it approached the tip of the XI. rib. The omentum was closely adherent to the anterior abdominal wall, and notably injected and red. A very soft metastatic mass about the size of a hen's egg was situated at the attachment line of omentum to stomach at the greater curvature; this metastatic deposit was so soft that when its thin peritoneal cover was lacerated while retracting the abdominal wound, the contents proved gelatinous, almost fluid in consistency, as in some very rapidly growing tumors. Thin, blood-tinged ascitic fluid issued from the abdominal cavity. The main tumor mass could not be isolated. Regional metastases were everywhere. Further separation of adhesions, handling of the extremely vulnerable structures, or detailed examination of the tumor masses was desisted from, for obvious reasons, and the abdomen immediately closed. For the anesthesia, equal parts by volume of chloroform and ether in a mixture, were given by the drop method. The recovery from the operation was uneventful.

As customary in such cases, the rectal dip was established immediately upon the patient's return from the operating theatre. A small catheter was inserted, for the purpose, about ten inches into the bowel, and the drip *started* at the rate of fifteen drops a minute. The patient received forty ounces of water during the first twenty-four hours. Nothing was given by mouth except a little tea in the morning, and this was retained. Fruit juices, in general, which were not tolerated by the patient even before operation, as well as plain albumen drinks, had to be avoided. During the first night, egg albumen disolved in water, was used as fluid for the rectal drip. Beginning with the following morning, *artificial milk* was substituted for albumen water. The drip was allowed to continue at the rate of 15-20 drops per minute, as nearly as possible. It is essential that absorption from the large bowel keep pace with the drip rate. Thirty drops per minute is apt to be too rapid, and the nutrient fluid accumulates within the bowel and is prone to be expelled. Such an explanation probably accounts for some of the failures in rectal feeding. A satisfactory formula for artificial milk and the one which was employed here, is the following:

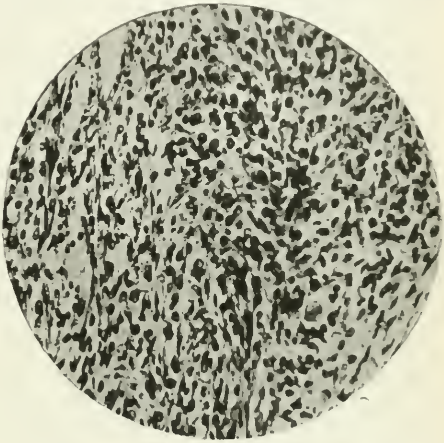

Fig. VII. Sarcoma, small spindle cell type. Section from the recurring growth (Pararenal Tumor). Microphotograph.

Whites of two eggs	
Dextri-maltose (No. II without salt)	3jv
Water up to	0j

In about one pint of water not warmer than 60° F., the whites of two eggs are dissolved, and the white, insoluble shreds which float about, are removed; then four flat teaspoonfuls of dextri-maltose are added. Each ounce of artificial milk has, roughly speaking, the same caloric value as an ounce of cow's milk. This makes it easy for the nurse to record the quantity of nourishment the patient receives in twenty-four hours, in terms of milk-equivalent. In a bed-lying patient from 50 to 90 ounces of milk equivalent are requisite daily; in a woman of small stature such as this patient is, fifty ounces daily would probably suffice to maintain her nutritional state. The rectal drip was allowed to continue, for instance, from 9 a. m. to 3 p. m., and after an interval of two hours resumed again at 5 to 6 p. m., and continued until 9 p. m. In this case, it was found necessary to interrupt the drip during the night. When indicated, an enema with weak peppermint water was given in the morning before resuming the drip. In the afternoon between 3 to 5 p. m. during the interruption of the drip the patient, except when too weak, was placed in a reclining chair while her bed was aired and changed.

The enlarging mass carried the descending colon forward, and encroached upon its lumen, producing relative obstruction and stasis with the distress caused by accumulating gas (April 11, 1915). Up to the present, gas distress was lessened by means of a peppermint enema daily. On account of distension, the skin wound had separated in the middle, but the underlying muscles were healed. Until today, the rectal feeding has been satisfactory, but the quantity absorbed during the day time was insufficient without the aid of the stomach. The patient's appetite has been very evanescent or absent altogether and the minute quantites of food she chose to take sufficed only to satisfy her hunger. The lump in the epigastrium, the annoyance from gas distension, some soreness and occasional pain in the wound and vicinity, were her chief complaints. Some nights she slept very well, and generally fared best without drugs. Then, for the first time, the gas distress became so persistent that colonic irrigation had to be attempted, m. XV. pituitrin hypodermatically anteceding this measure by fifteen minutes. The result was relatively unsatisfactory because the flow of water in the bowel was blocked by the pressure of the tumor. Again, substantially for this reason, the insertion of the rectal catheter for feeding by the drip method, had to be discontinued, and sole reliance based on the fractional method of feeding by the mouth, allowing one-half ounce, and later one or two ounces of food, every hour. In this manner, the patient ingested about sixteen ounces of food in the course of 24 hours: perhaps one-fourth the quantity required for her sustenance. She nibbled at the dainties put before her and chewed the juice out of bits of meat. Her face looked drawn; her eyes sunken. But she suffered no acute pain; a single dose of scarcely more than half a grain of codeine phosphate was sufficient to make her comfortable. Two small painful nodes—metastases in the lymphnodes—appeared in the right groin; and, a smaller nodule in the left axilla.

The patient steadily lost ground. On April 23, 1915, she took practically no food. The pulse was rapid, 132; the throat dry, but the mind, remained clear and she complained of no pain. Two days later the pulse rate rose to 140 per minute. The bowels remained inactive for three days past, but the gas distension was only moderate. Finally the increasingly difficult breathing, and the cyanosis of the patient's face and hands, indicated the accumulation of carbon dioxide, and the exhaustion of the respiratory center which presaged death (April 26, 1915).

In this rendition of the entire clinical course of a case of concurring newgrowths, the pararenal tumor with its benign and malignant phases, is of considerable independent interest. Indeed, many sections from various parts of the parent growth proved it to be histologically a fibroma. There were, however, a few peculiarities. The tumor was quite cellular, and had not the usual whorls. There were areas in which the tissue appeared myxomatous, and within this precinct a few large connective tissue cells of distinctly irregular type, and some cell-conglomerates of irritation giant-cells could be found; but the most searching examination revealed nothing which, from the present day point of view, could be considered definitely prognostic of malignancy. (F. C. Wood, G. L. Rohdenburg, C. Z. Garside, J. Diner).

On the other hand, with the knowledge of the subsequent behavior of the case after an apparently complete and satisfactory removal of the parent growth, it becomes clear that the fact that the parent tumor reached the size of a small adult head in the course of about 21 months, should have been given a more compelling significance in deciding the question of its benignity. Practically speaking, it is the *rate of growth* which makes the tumor malignant. The rapidly proliferating cell, invades; it causes metastasis when it gets into blood or lymph paths. The rapidity proliferating cell need not be very atypical, in order to characterize it as malignant; indeed it may be only so, with extremes of irritation, or when there is external interference with cell division, mechanical or chemical.

A pararenal growth which is solid and not cystic, and enlarges at almost half the rate of the "normal tumor of pregnancy" must be dependent on a very rapid proliferation of the cells which constitute it, and ought to be considered protentially malignant, at least from the clinician's viewpoint.

In the present case, the pararenal recurrence must have arisen from a vestige of the kidney capsule near the hillus, in which a microscopic portion of the parent tumor was retained. Perhaps, therefore, if the kidney had been removed with the tumor, in the first instance, instead of conserving it, this recurrence might not have been as likely. With the conception that such a tumor is innocent, however, this step would not be justifiable. It is plain, that the newgrowth, notwithstanding its microscopic appearance, should, from the beginning, have been treated surgically, not as a simple fibroma, but as a tumor which is liable to recur.

In short, from these clinical considerations it is not an example of two separate concurring tumors which presents itself, a fibroma at first, and sarcoma later; nor a growth belonging to the class of mixed tumors. The most natural interpretation, and the one which is absolutely compatible with the existing data, cellular character and rapid growth; is that the tumor was one which should be classed as malignant in its parent tumor phase, and that it merely unfolded its malignant qualities more clearly as it developed and matured. Dr. F. B. Humphreys, pathologist to the German Hospital of this city, who reviewed the material of the growth and recurrence, following the classification of Borst, characterized it as a *fibroma sarcomatosum*—a term which, it seems to me, is of real practical worth because it *accurately expresses the clinical course which this tumor may be expected to take.*

133 West 72nd Street.

THE CONSERVATIVE TREATMENT OF ECLAMPSIA.

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Any attempt to present a specific method of treating that complication of pregnancy generally and popularly designated as "eclampsia," may be met with the more or less just criticism that in view of our lack of knowledge of the etiology of this condition, such methods must be empirical and unsatisfactory. To a certain extent the criticism is a perfectly reasonable one and although we do not know the precise etiological factors at the basis of the disturbance we may assume that the designation "toxemia" will cover in a general way the nature of the trouble. Just why the incidence of pregnancy should bring about such a serious disturbance of the maternal organism we cannot say, but we do know that it constitutes one of the most serious manifestations of the pregnant state and that we must exert ourselves to treat the same to the best of our ability. As pregnancy is assumed to be a cause of eclampsia it seems natural to conclude that the *sine qua non* of all therapeutic measures should be the early and prompt delivery of the patient. This is a fact which cannot safely be denied and yet in our attempts to remove with despatch the products of conception we may jeopardize the mother's life more than if more conservative measures are relied upon. In view of the seriousness of these toxic states in the latter months of pregnancy it is quite natural that radical methods of treatment should have been devised and that they find many advocates.

The suddenness of the onset in many cases and the knowledge that the disease is frequently terminated by delivery usually prompts our decision to rely on immediate delivery. On the other hand we have the opinion presented of those who adhere to a more conservative procedure and think less of the immediate delivery of the mother than of a prompt elimination of the toxic materials which are supposed to be at the bottom of the trouble. The battle between these two widely opposed camps has been vigorously waged for a number of years but the results thus far obtained cannot be said to favor either side exclusively. Among the more radical methods of treatment in eclampsia may be mentioned accouchement force with version or high forceps, and Cesarian Section both by the abdominal and by the vaginal routes. There are many advocates of these methods of treatment particularly as it appeals to the surgical instinct which is now so prevalent in obstetrics and because the serious and alarming symptom which the patient presents naturally engender the thought that something ought to be done and done quickly. It is needless to more than call brief attention to this method, which finds its chief advocates among that class of practitioners who have become expert in the employment of various operative methods of delivery. The more skilled they are, the better the results in a certain proportion of their cases and probably due to the fact that by such skill they largely reduce the amount of shock and the chances of septic infection. This attitude, however, should not serve as a universal basis for our treatment of eclampsia, and although the results as already stated may be excellent in the hands of those especially skilled, a more conservative attitude should be assumed.

Bearing in mind the fact that we are dealing most probably with an accumulation of toxic material in the mother's system, which we know by experience can be gotten rid of or at least diminished in amount through the usual channels of elimination, is it not rational that in every case we at least combine such procedures with whatever operative methods we may find advisable to pursue? The personal equation in this instance probably counts for a great deal. To one who has been successful with radical methods the other methods may seem inconsequential and time consuming. On the other hand one who has followed the more conservative procedures is convinced that the good results which attend the same bespeak for this method its general adoption. It would be a great error, however, to adhere closely to either school, because the severity of this form of pregnancy toxemia varies greatly and its effects on the organism are subject to the individual differences, so that it were better perhaps if each case were studied and handled as a unit and approached from the standpoint of treating the symptoms as they present themselves in the patient rather than attempt to treat the disease as a whole. Such a method has been followed in other condiitons which were formerly regarded as amenable only to specific methods of treatment. In connection with this thought I always look back to the teaching of Dr. Delafield in discussing the treatment of pneumonia, when he invariably told his auditors that the patient and not the pneumonia was to be treated. I have no intention whatever to decry the successful results obtained by the method of rapidly delivering the mother, but I feel that they are counterbalanced by the good results obtained by strictly conservative methods, and I can merely repeat that in a case of a well developed instance of eclampsia we ought to be prepared to resort to radical methods of delivery as the circumstances may demand.

My own observations in this disease have extended over a period of years during which I have had an opportunity to personally watch the results of various methods of treatment both in hospital and in private practice and I have failed to be convinced that any extreme plan of treatment is the desirable one. Personal experience, however, with a series of cases of all degrees of virulence have made me very much more conservative. As we are dealing with an organism that is in a condition of serious shock, it seems to me that we add to it by rapid operative or forceful methods of delivery and also increase the opportunities for subsequent infection. Our entire regard should be for the mother, as the infant in practically every instance is so poisoned that its life, even if it survives the immediate operation, is very often not prolonged beyond the first twenty-four or forty-eight hours. In many instances moreover the babies are premature and this detracts from their chances of survival. Why should we therefore consider the life of the child in such critical cases when the possibility presents itself of perpetuating the life of the mother and the possibility of future pregnancies with normal children? If the conditions are such that a living child may readily be delivered this, of course, should be taken into consideration, but where the mother must be mutilated in order to give birth to an immature and already sick baby, the benefit of the doubt should be given to the mother rather than her offspring.

In connection with the above argument I want to present some personal experiences with cases of eclampsia. I have no desire at this time to present statistics, I merely want to submit a few facts and after a sufficient number of personally conducted cases has accumulated I hope to present a more extended study of the subject.

I desire to state that for the past five or six years I have not considered immediate delivery in any case of eclampsia except where this has been possible without injury to the mother. The latter statement may be further elaborated by making it include all cases in which the dilatation of the cervix has advanced sufficiently far to permit of an easy forceps extraction in primiparæ, or podalic version in multiparæ. The following cases are typical of what has occurred in my personal experience and upon which I have based my personal opinions in the treatment of eclampsia. They are presented in as brief a manner as possible and only the salient facts in connection with the case are stated.

Mrs. K.—Admitted to the Lying-In Hospital February 10, 1914, after having been seen in consultation. The patient was a young primipara who was supposed to be about seven and one-half months pregnant. She had been perfectly well with the exception of occasional headaches during the previous week or two. She was found in an unconscious condition by her husband on that evening, and as she had not answered a telephone call about noon on that day it is probable that she became ill on or before that time. The woman had several convulsions subsequently and when seen presented the usual evidences of an eclamptic seizure. A hypodermatic injection of morphine was given and the patient taken to the hospital, where a catheterized specimen of urine was found to be solid on boiling. During the first twenty-four hours the patient was given a total of one and one-half grains of morphine hypodermatically together with repeated doses of nitroglycerin. All attempts at washing out the stomach or giving rectal irrigations and packs were impossible during the first few hours because of the extreme restlessness of the patient. As she came under the influence of the morphine, however, it was possible to institute the eliminative treatment and she became quieter. On the evening of the second day a specimen of urine obtained by the catheter showed only marked traces of albumen. A vaginal examination disclosed a long, rigid cervix and a small fetal head not engaged. The fetal heart sounds were very indefinite. The mental condition cleared up in a few days and as the urine continued to present evidences of a nephritis the irrigations and packs were kept up for another week. About ten days later the patient complained of cramp-like abdominal pains, which were not severe, and the nurse failed to report them. While in a hot pack the patient quietly delivered herself of a small dead fetus without effort and made an uninterrupted recovery. She was subsequently treated for minor gynecological complaints, including an extensive ulceration of the cervix. A curettage was done, but the scrapings merely showed an hypertrophied condition of the glandular structures of the cervix.

Mrs. M.—A para-i near term was admitted to the Lying-In Hospital April 5, 1916, with a history of having had convulsions for several hours previously. Examination showed a rigid closed cervix, head at the brim, fetal heart good. She was given morphine, colon irrigations and packs, and eight ounces of blood were taken from a vein. There was almost complete suppression of urine at the time of admission. The patient only had one more convulsion after treatment was begun, on April 7th. That evening labor pains began and early the next morning the head reached the outlet and an easy low forceps delivery was done. The child did not breathe well, the color remained grey and it died within twenty-four hours. The mother's condition improved rapidly and she was perfectly rational during her labor. In this case the convulsions were very severe as shown by the extreme edema and laceration of the tongue at the time of admission. The patient made an excellent recovery.

Mrs. D., a young primipara about six months pregnant was seen in consultation September 17, 1916, with a history of having had headaches and traces of albumen for several days. When first seen the patient had had three convulsions and was in coma with marked edema of the face, hands and feet. There were no evidences of labor present and no effort was made to induce the same. The patient was given morphine and likewise irrigations and hot packs, and a stomach washing. There were two convulsions after treatment was begun, but when seen again about five hours later the cervix was found thinned out, membranes bulging and the head well engaged in the brim. A light ether anesthesia was started, the membranes ruptured and a fetus weighing about a pound and a half extracted with the hand. The fetal heart showed pulsations, but there were no efforts at respiration. During the succeeding twenty-four hours the patient gradually came out of her coma and passed over ten ounces of urine, although there had been complete suppression for the previous twenty-four hours. The patient made an uninterrupted and rapid recovery.

The three cases reported herewith are but a few of those that have been treated by me in a conservative manner. In none of this class of cases was there any evidence of labor at the time the eclamptic symptoms began, but in each instance this came on spontaneously.

In another class of cases where the pregnancy was further advanced and the cervix short and dilated about one or two fingers, labor was induced by the employment of the Voorhees' bags with the expectation that possibly a living baby might be secured without undue risk for the mother. In each of these cases the usual eliminative treatment was also employed. After full dilatation of the cervix was secured the delivery was allowed to proceed normally, or a forceps extraction employed to terminate the labor as the case demanded. My reason for attempting to hasten the process in these cases was merely because the labor would be more prolonged and of course more difficult than during the early months, and that any time we might gain would redound to the credit of the mother. I have not been greatly impressed, however, with the value of such a procedure and do not believe that the time gained is a factor of importance in these cases. A recent experience will explain my meaning.

A young primipara at term, in the Misericordia Hospital, suddenly developed severe general convulsions during the early morning of October 11, 1916. The urine was almost solid on boiling and there was a history of constipation and headaches for several days previously. The patient was immediately started on the usual eliminatory and sedative treatment and when seen about 9 A. M. the cervix was found short, about one and one-half fingers dilated and the head at the brim. The convulsions had been very severe and the patient failed to rouse during the intervals. A Voorhees bag was inserted and extracted about five hours later when the cervix was found four fingers dilated and thinned out. The membranes were then ruptured and the head promptly came down into the lower uterine segment. The patient had two more convulsions during the afternoon and when seen about 10.30 P. M. (October 12th) the head was found in midpelvis, a large caput present and the cervix very rigid. No fetal heart sounds were heard during the day and it was thought advisable to terminate the labor at once. A craniotomy was indicated, but the instruments not being at hand the cervix was dilated and a forceps extraction done. The patient had no further convulsions and gradually recovered from her coma.

It is my belief that since the baby was dead a delay of five or six hours more would have resulted in an ordinary delivery and that nothing was gained by hastening it. A similar conclusion was reached in almost every instance in which the procedure was adhered to, but there is another class of cases in which labor has advanced to such a degree that an easy delivery is possible. A case of this kind is exemplified in that of

Mrs. C., para-iii, about eight months pregnant, who was seen October 21, 1914. She had complained of nausea and headache for several days and there was also pain in the epigastrium. The pulse was slow and of good quality, but as the patient had been restless during the previous night and the retching was very troublesome it was thought advisable to administer a hypodermic of morphine before beginning other treatment. While the hypodermic was being prepared the patient suddenly had a severe general convulsion and this was succeeded by two more within the next hour. In the meanwhile an examination showed a thinned out cervix of about one finger's dilatation and the presenting part was free above the brim. As the patient was out in the country and assistance limited, an immediate delivery was decided upon. The cervix was quite readily dilated by the Harris method under light ether anesthesia, the membranes ruptured and a complete podalic version done. A small baby weighing about four pounds was secured, which lived, but has not been a robust child. The mother had no further convulsions, but made a slow recovery, the albumen persisting for a long time.

In this case the immediate delivery was undertaken because of the inability to make use of other methods of treatment and the ease with which it was thought possible to do the same, but a case of this kind must not be compared with that of a primipara in whom such a simple method of delivery could not have been employed.

The clinical histories briefly outlined above serve as examples of other cases that I have personally observed and treated by a method, the chief features of which are not original and are as follows:

As soon as I am called to a patient having an eclamptic seizure, an order for morphine sulphate grain ¼ hypodermatically is given and the attendant directed to give a strong soap suds enema if possible. Should the patient become conscious after the convulsions, from one-half to one ounce of magnesium sulphate dissolved in water is given by mouth. The usual precautions against lacerating the tongue are likewise to be instituted, and the patient is undressed and put to bed. If a hospital is within reach, arrangements are also made to transfer the patient immediately. The first dose of morphine is repeated within an hour if the patient is robust and does not respond well to the first dose, otherwise only one-eighth of a grain is given and this is repeated twice at intervals of an hour. Preparations are also immediately made for high colonic irrigations with sugar solution, using a teaspoonful to the pint and giving at least two gallons at a temperature of 110° F. for the first irrigation. A soft rubber rectal tube provided with a funnel is the best for the purpose, as this permits of syphoning out whatever fecal matter may still be present after the enema. The patient is kept on her left side during the irrigation and if very restless a mild degree of ether anesthesia may be employed with an open cone or by the drop method, using an ordinary chloroform mask. At the conclusion of the irrigation at least half a pint of fluid is to be left in the rectum. Preparations for a hot pack also having been made, the patient is kept in the wet blankets for about twenty minutes and then in dry blankets for an hour. If the opportunity offers a vaginal examination is also made and if the patient is at or near term a Voorhees bag may be inserted provided the cervix is soft and sufficiently dilated. In the earlier pregnancies, however, I have refrained from this measure. If possible gastric lavage is also resorted to and if the patient has not been conscious long enough to swallow magnesium sulphate this may be given through the stomach tube. As a rule it is not well to institute any of these measures, which require disturbing the patient, until the morphine has had an opportunity of producing sedation or an anesthetic can be given. The irrigations and packs are repeated at intervals of four hours. If the convulsions have been very severe, and also in cases where no convulsions are present but the blood pressure is over 175 and the patient shows marked cyanosis and embarrassment of respiration, a vein is opened in the arm and from 8 to 12 ounces of blood allowed to escape. As a rule I do not employ venesection unless the patient is robust, the pulse full and marked cyanosis present. A specimen of urine should be obtained by catheter if necessary and immediately examined. If after the first series of morphine injections the patient has failed to deliver herself within a period of ten or twelve hours, further small injections may be employed, or chloral hydrate in 30 or 40 grain doses, together with sodium bromide of about the same amount may be administered per rectum. If no further convulsions have occurred this is unnecessary. I formerly employed nitroglycerin in doses of 1/50 of a grain at varying intervals, but failed to get a satisfactory effect on the pulse and have since abandoned this drug. I also formerly used veratrum viride occasionally where the blood pressure was high and the pulse full, but in one instance the pulse rate and blood pressure dropped so quickly that the effect was rather startling and I have likewise abandoned the use of this drug. After a proper interval, depending on the features presented by the individual case, another vaginal examination may be made and if the cervix is sufficiently dilated, as it frequently is, the membranes may be ruptured if this has not already taken place. Again, if the fetal head has descended to the lower portion of the pelvic canal a forceps extraction may likewise be done. In a great many instances if the babies are born alive they show the effects of a toxemia and must be carefully watched for several days as they are likely to develop convulsive seizures. They should not, of course, nurse the mother for several days after birth. If the breasts become full they may be emptied at regular intervals with the breast pump. In most cases the patient seems to recover from her condition as soon as free diuresis and catharsis has begun and even if convulsions occur before delivery they are in most cases less severe. After delivery has taken place the eliminative treatment must, however, be continued until the urinary secretion again approaches the normal.

The indications for other methods of delivery have already been referred to, but I find it less necessary to resort to operative procedures as I have learned to become more patient and wait for a natural delivery. The above is but a brief outline of the conservative method of treatment which I have followed in a considerable number of cases. I believe that there are cases in which a more rapid delivery is necessary by Cesarian Section, where a primipara at term presents an elongated rigid cervix and has a large child with a head at or above the brim. In these cases, even under ordinary circumstances, labor may be very much prolonged, likewise where a complicating placenta previa, contracted pelvis or other dystocia is present. The abdominal Cesarian Section done early provides the best method of delivery in such cases with the least amount of shock to the mother, but the eliminative treatment must likewise be carried out after delivery as the postpartum convulsions may be equally as serious as any other.

In view of the fact that eclampsia seems to terminate in labor, we ought, I think, to be more conservative in our attitude towards this disease. It is one which in almost every case can be ascribed to neglect of the patient, whether it is due to her own carelessness or that of the physician. But if proper precautions are taken the occurrence of eclampsia in general practice ought to be greatly diminished. Good results may be obtained in most early cases if the fact that a toxemia is present and fully recognized by the physician, and appropriate measures taken to combat the same.

23 East 93d Street.

MANAGEMENT OF LABOR IN BORDERLINE CONTRACTIONS OF PELVES.

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No subject seems to be less understood by the practitioner than that of the management of labor in borderline contractions of the pelvis. The great disparity between the results of such labors conducted in private practice and the results of those conducted in a well organized maternity is sufficient evidence that the basic principles underlying the management of labor in contracted pelvis are not grasped by the practitioner whose obstetric work is occasional. Fortunately, in this country, extreme degrees of pelvic contraction with marked deformity are extremely rare. We have, however, a large number of relative contractions which may be grouped under (1) those with flattening of the inlet, the simple flat pelvis, a result of nutritional disturbances, or early occupational deformity, and (2) the justo-minor or generally contracted pelvis which is distinctly an American type. In addition to these, brim contractions which so often pass unnoticed until they cause dystocia, (3) funnel pelvis, or contracted outlet, is not without clinical importance. These three types of pelvis cause so little change in the general appearance of the woman, that unless the practitioner resorts to routine pelvimetry, many women will fall into labor and dystocia result without his appreciation of the cause. The modern obstetric art assumes that the man who undertakes the delivery of a woman is sufficiently equipped to deliver her by such means as will insure a living child and a living mother whose soft parts have not been excessively traumatized, or if these have been unduly injured, to repair them in such a way as to leave her anatomically normal. To accomplish this end successfully, and give each woman what she is entitled to, she must receive proper prenatal care.

in order that her general health may be put in the best possible condition, to withstand the strain of labor. If she is a multipara this investigation must also include a history of her previous labors, and an estimation of her inlet and outlet diameters. If she is a primipara, more exact mensuration becomes of still greater importance, because here we have no record of past labors to guide us during subsequent performances. Furthermore, it is important to estimate by external palpation and fetometry, the approximate size of the fetus, and to accurately determine its presentation, position and posture. No physician should undertake the care of obstetric cases, unless he has the time and willingness to study the rate and rythm of the fetal heart throughout the course of labor, for obstetrics today is knowing what you are going to meet, and preparing yourself to meet it, and in all difficult labors the character of the fetal heart determines the course to be pursued. Obstetricians now, more than ever before, are recognizing the right of the unborn child. The heart during a normal contraction of the uterus, in the second stage, shows extreme flights. Add to this the trauma of moulding, and we get cyanosis, etc. Finally the most important factor in the conduct of a complicated labor, is the training in obstetrical asepsis. It is beyond dispute that vaginal examinations made through an unprepared introitus, bear a direct relation to the frequency of sepsis. The skilled man is able to carry a woman through labor and note the progress of the fetus in its descent through the pelvis, by repeated abdominal and rectal examinations. Granted that the practitioner has equipped himself in these requisites, each case resolves itself into the question of whether a particular baby can pass through a particular pelvis at this time. The ability to answer this question is what has made some men great obstetricians, for whether the fetus will or will not pass through a given pelvis, depends upon the relative size of the fetus to that pelvis, the malleability and mouldability of the fetal head, the presentation, position and posture of the fetus, the axial relation of the fetus to the several planes of the pelvis, and the force of the uterine contractions. It is not difficult for a man to recognize an absolute contraction of the pelvis which will not permit the passage of any child, but it is difficult for him to estimate the prognosis in a relative disproportion, where the child has gone over term, with ossification of the fetal vault, or where the baby is oversized from overfeeding, or where the inclination of the pelvis does not admit of its ready entrance, or where the brim contraction, though slight, is enough to disturb the normal posture. It is these cases and these relations which test the skill of the accoucheur. In an analysis of 100 cases of pelvic contraction, with a true conjugate of 8.5 or more, including flat and justo-minor pelvis, where the labor has been conducted on the general principles to be laid down in this paper, namely, that each woman with a relative or actual contraction of minor degree, should be given an aseptic test of labor before determining what mode of delivery is necessary, we find that over eighty per cent. have been delivered spontaneously. Many of these women were carried along for hours, by the administration of morphine and scopolamin until the termination of the first stage dilation of the cervix was complete, the longest first stage was 68 hours—the shortest 5. Even where amnesia was not obtained, the beneficial effects of morphine on the woman permitted her to work for hours without undue strain, i. e., until the canalization was complete. Preservation of the membranes until their spontaneous rupture, or until they appear at the vulvar orifice, cannot be too strongly urged, for it is only through the hydrostatic action of the bag of waters and the pulling up of the lower segment by the contraction of the longitudinal fibres, that complete dilatation can be obtained. Furthermore, it has been shown, that even with the bag of waters intact the fetus sustains considerable injury during prolonged uterine contractions, from an interfered-with circulation, and this interference is much greater, and the child's chances of life are lessened, in labors where the membranes have ruptured early and the uterine muscle has moulded about the body of the child. Finally it must be again admitted, that the danger of infection is less with the membranes intact, than after the waters have passed away, for the healthy amniotic surface has greater resistance, than where the woman is the subject of a dry labor.

As has already been mentioned, in considering the management of any labor case, obstructed by a pelvic contraction, certain factors deserve the most painstaking consideration. In multiparae, the history of previous labors, the difficulties met, and the size and condition of the child delivered, should be given full weight. In primiparae, unfortunately, we have no history of previous performances to guide us, yet in every case one must consider not only the actual mensuration of the pelvis and its inclination, but also the size of the child, its development, the maleability and mouldability of its head, the age of the woman, the build of both parents, and finally that unknown quantity, the uterine contractions. Experience has taught us that to say a conjugate vera of nine centimeters or less, demands section, without weighing the other factors upon which successful delivery depends, or without giving the individual case a test of labor, is not scientific obstetrics, and subjects the woman to hazards which she should not be asked to take. A study of our labor records show that 80 per cent. of our pelvic contractions result in spontaneous delivery. This being a fact, the day for the induction of premature labor as a method of treatment in pelvic contraction is a thing of the past, for an induced labor is an abnormal labor and not only opens the way to sepsis, operative intervention, and bad judgement, but it is actually fraught with as much danger as operative procedures in skilled hands. The mortality to the child as a result of induction of premature labor in pelvic contractions, where the true conjugate is between 8.5 and 9.5 cm. is actually over twenty per cent. The premature child bears trauma badly, and in premature labor it is not uncommon to have the membranes rupture early. This subjects the child to interference with the feto-placental circulation from prolonged labor, and the pressure of undilated soft parts, and increases its risk by necessitating some form of operative delivery. The mortality to the mother from the induction of premature labor is hardly better, when the case is skilfully conducted, than that from section or pubiotomy. Some obstetricians still contend that podalic version and podalic extraction is a solution of the difficulty in minor degrees of flat pelvis. This we cannot admit, and we have relegated version to a place among the emergency procedures. Our reasons for doing this are that while theoretically and, to a degree practically, the after-coming head may, if properly guided, pass through a flat pelvis, while the same fore-coming will not, the primary fetal mortality resulting from the adoption of such a procedure is so large that version has been replaced by spontaneous labor and median forceps where it is possible for the child to come through, and in those cases where the head has not engaged and remains persistently arrested at the inlet, pubiotomy or section have been elected as the method of delivery. I must repeat that what is said here only applies to borderline contractions and relative disproportions between child and pelvis. Our deductions and our conclusions as to management are the results of an extended experience in these borderline cases, and from this experience we can most emphatically state that each borderline case should have a full test of labor, which, if properly conducted, does not decrease either the woman's or the child's chances. What we mean by the test of labor is, first, after having ascertained by careful examination, the size of the pelvis, and estimated the size and hardness of the fetal head, and determined its position and posture, the woman is allowed to continue in labor until the cervix is completely dilated. The membranes, if possible, are preserved until this is accomplished. During this time no vaginal examinations should be made, but the progress of dilatation and the advance of the fetus are determined by rectal examination and by following the course and descent of the anterior shoulder and the fetal heart from its original position downward and inward toward the symphisis pubis. When the cervix is fully dilated, and yet the head is not engaged, the woman should be given at least from one to two hours in the second stage, after the membranes have been ruptured, carefully taking at intervals of fifteen minutes the rate and character of the fetal heart. This allows moulding to take place, and frequently we have seen a head which would not engage even after hours of first stage labor, enter the transverse diameter of the pelvis and descend to the ischial spines under the influence of second-stage uterine contractions, supplemented by the expulsive action of the abdominal muscle. During this waiting period the attendant should not only keep careful watch of the fetal heart as referred to above, but also note the woman's pulse and temperature and make an accurate observation of the situation of the retraction ring, and the distension of the lower uterine segment, for it cannot be denied, no matter how enthusiastic one may become over the power of the natural forces, that possible uterine rupture is an accident which may occur when dealing with these borderline cases, unless the danger signals are carefully observed and recognized. Dilatation of the soft parts and moulding of the fetal head takes time, and can only be accomplished by allowing the woman certain periods of rest, which may be secured by the administration of chloral or morphine. Perhaps the greatest cause of meddlesome midwifery and hurry in the conduct of borderline contractions, is the suffering of the patient, and this suffering and tire really becomes an important factor when operative procedures become necessary, as it contributes to increase the maternal morbidity and mortality. Reynolds showed in his study of 209 Cesarean sections that the mortality bore a direct relation to the length of time the woman was in labor. This fact has been disproved by our experience, because we have robbed these labors of their two chief dangers, namely, infection and exhaustion. The former has been prevented by strict asepsis and the avoidance of the vaginal examination, and the latter accomplished by the judicious use of morphine and scopolamin throughout the first stage. In funnel pelvis, the difficulties encountered are at the outlet, and while every sixteenth woman has some degree of funnel pelvis, but a small percentage of bisischial narrowings result in actual outlet dystocia. In the funnel pelvis, the bisischial diameter, which is normally 10 cm. or 4 inches, in length, is reduced to 8 cm. or less. Associated with this is a narrowing of the subpubic angle and a closer approximation of the pubic rami. Hence, in order to get out of the pelvis, the head must pivot at a lower point on the pubic rami than is normal. This pushes the head backward into the posterior segment between the bisischial line and the tip of the sacrum, namely, into the posterior saggital diameter of the outlet, which must be of sufficient length to compensate for the deficiency in the bisischial. Roughly speaking, a bisischial of 8 cm. must have a posterior saggital of 7.5 cm. or over, in order that the ordinary head may escape from the pelvic outlet. Since appreciating the frequency with which funnel pelves are met, we have noted that practically all of the extensive lacerations of the levators and sphincter ani occur in funnel pelvis. For as the head escapes from the outlet, the greatest trauma is thrown upon the posterior pelvic segment or the retro-vaginal structures (illustration). Our experience convinces us that all labors complicated by borderline contraction of the pelvis should, when possible, be conducted in a hospital, for the woman should first be given the test of labor, and this test should be conducted under the most careful surgical asepsis, even without vaginal examinations, and if possible with the membranes intact until the cervical canalization is complete. When this is accomplished, the membranes may be ruptured, and if the condition of the woman and child is satisfactory, a few more hours may be allowed for the head to crowd in through the pelvic brim. In flat pelvis, the relation which the saggital suture (which lies in the transverse diameter) bears to the pubis and sacrum is a good index of progress. If the head is going to enter the pelvis by lateral rotation, the parietal bone pivots on the promontory, and the saggital suture will gradually approach nearer and nearer to the sacrum. In justo-minor pelvis, the flexion is exaggerated, and the moulding extreme here, the low position of the post fontanelle, shows the degree of flexion. Meanwhile careful attention must be given to the fetal heart and maternal condition. The adoption of such a plan has resulted in engagement of the presenting part and spontaneous delivery in 80 per cent., engagement of the head and application of median forceps to complete the second stage in about 4 per cent. and pubiotomy or section in the remaining few 86 per cent. of the children were born alive. Certainly the interests of the fetus have been conserved by following such a plan. We are of the opinion that in those cases where, after a test of labor, the head fails to engage, pubiotomy or extraperitoneal Cesarian section give the woman and child the best chance. Surely the maternal results from section are as good as those from the use of forceps on the unengaged head, while there is much less danger for the child. Forceps to the floating head cannot be too strongly condemned, as bruised and maimed babies and death from wet brains are not of infrequent occurrence from forceps compression, while in addition the woman's soft parts are extensively damaged. We would select pubiotomy if the woman was a multipara, with a flat pelvis with a conjugate vera of 7.5 or over or in a justo-minor contraction, where the anterior-posterior diameter is 8.5 or over. The larger the conjugate, the better the prognosis in pubic section. Decision to do a hebostectomy presupposes full dilatation of the soft parts. Pubiotomy is the operation of choice if a woman has had repeated vaginal examinations, or if the membranes have been ruptured for a long period. On the other hand, in primiparae with pelvis of 8.5 cm. or under, particularly if the dilatation of the soft parts is not completed, ab-

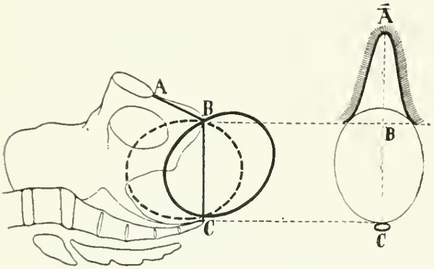

Figure 1. Funnel pelvis. Spontaneous delivery possible because of relatively large posterior sagittal diameter even though transverse diameter is very small.
A-B, anterior sagittal diameter.
B-C, posterior sagittal diameter.
A, inferior border of symphysis.
B, tuberosity.
C, end of sacral vertebrae.

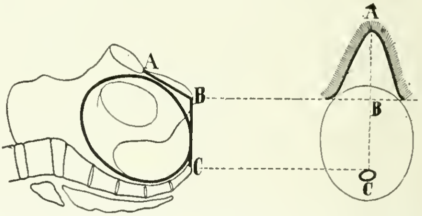

Figure 2. Funnel pelvis. Spontaneous delivery impossible because of small posterior sagittal diameter even though transverse diameter is relatively large.

dominal Cesarian Section offers the best route for delivery, and the extra-peritoneal method seems to us to be method of choice in these late cases, for it has been shown clinically that where the membranes have been ruptured for a long time pathogenic bacteria can be demonstrated in the amniotic sac, extra-peritoneal delivery prevents soiling the perioneal cavity with these organisms.

Most of the bad results attributed to pubiotomy, such as bladder injuries, have occurred in those cases where tenative traction has been made on the head with forceps prior to the pubic section and a rent in the vaginal structures started, or where the forceps have been left in place and used to bring the head into the pelvis after section of the pubic bone has been made. All anterior wall and bladder injuries can be directly traced to placing the soft tissues on the stretch between the forceps and the cut ends of the bone. In our clinic, when pubic section is done, the head or the presenting part is allowed to descend spontaneously into the pelvic cavity and reach the ischial spines before any artificial effort is made to deliver it. In this way the soft structures are conserved. Should the presenting part fail to enter the brim after the pubis is divided, the woman is allowed to come out of her anaesthetic in order that the uterine contractions, either unaided or excited by the administration of pituitary extract, may force the presenting part into and through the pelvis. After the head has become engaged, should it be necessary to hasten the delivery owing to variations in the fetal heart beat, it is an easy matter to apply low forceps and deliver.

In funnel pelvis, the dystocia does not occur until the labor has gone well along into the second stage, and difficulty is encountered in getting the head free from the outlet. This obstruction results from the head pivoting at a lower point on the pubic rami than in the normal case, hence it must come out through the space between the bisischial line and the tip of the sacrum, or the posterior saggital diameter of the outlet. When arrest at this point is met, the posterior saggital diameter may be actually lengthened by turning the woman on her side and flexing her thighs on the abdomen and conducting the delivery in this position. Should posture not increase the anterior-posterior outlet diameter sufficiently, pubic section will be necessary. Our statistics show 80 per cent. of spontaneous deliveries, 4 per cent. of forceps extractions, 6 per cent. of pubic sections, and 10 per cent. by Cesarian. The points we desire to emphasize as the result of our clinical experience in the management of this class of cases are as follows:

1. That accurate pelvimetry is absolutely necessary in order to recognize the type of deformity:
2. That pelvimetry without the relative estimation of the size of the fetus is of little value and that the most accurate fetometry is the test of labor.
3. That every borderline case should be given a test of labor and that this should be conducted in a hospital under the most scrupulous asepsis. That all examinations should be made through the rectum. Only in making the ultimate decision as to procedure is a vaginal examination to be made. This is then done with the patient anaesthetized and under the strictest surgical technic.
5. That spontaneous delivery will reward patience and vigilance in 80 per cent. of such cases:
6. That pubiotomy is safe in multipara with flat pelvis of 7.5 cm. or over and in justo minor contraction when the conjugate vera is over 8.5 cm. and in funnel pelvis in primiparæ. That the Doederlein technic is the simplest and safest.
7. That extra-peritoneal section should be elected as the method of delivery when the labor has been prolonged and the membranes have been ruptured for a long time. The classical operation should be reserved for the elective cases, and finally, that no hard and fixed rule can be set down for the management of any case. Each case has to be individualized.

THE TREATMENT OF PLACENTA PREVIA WITH SPECIAL CONSIDERATION OF CESARIAN SECTION.

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Teachers of medicine should be particularly careful of their utterances, for not only their students but the whole medical fraternity will think that they speak *ex cathedra*, with all the force of authority. This is important in the discussion of the merits of Cesarean section in the treatment of placenta previa which has been prosecuted with almost a furor by obstetricians within the past three or four years. One who has attended the meetings of the State Medical Societies during this period will surely notice the growing impression among general practitioners (who, after all, do the obstetrics of the world) that Cesarean section is to be regarded as the remedy *par excellence* in such cases and there is much source for anxious thought in this dangerous attitude. Recently, in conversation with one of the leading obstetrical teachers in this country, he told me of the following incident. He had been called over the telephone by a practitioner fifty miles away, in a small town, to give his advice. The doctor said: "I am getting ready to perform a Cesarean section for placenta previa and I want your advice as to details. I have done two sections in such cases. The first died from hemorrhage. In the second case to avoid this danger I put clamps on the broad ligaments and left them on, but she died in six hours of embolism and I thought you might give me some advice that would help me." The professor advised him not to do the section at all, but he replied: "I must do the section, as it is generally recognized that this is the best treatment." This is a very significant picture of what is probably going on all over this country today, because many a brave, conscientious, but incompetent doctor feels that Cesarean section is the proper treatment for placenta previa. If the teachers of obstetrics begin to tell their students that section is the proper treatment in even a minimum of such cases then we may well shudder over the legalized murder that will be done. But after all that has been written on this subject the impression made upon the profession has been unintentional, for the teachers who have spoken have no doubt meant less than their words have conveyed. In recent interviews with a number of leading obstetrical teachers, in the large medical centers of the North and East, when I have pressed the question, "What are you going to teach your students about this matter?" all, save one, have agreed in saying: "I shall teach that in cases of placenta previa Cesarean section should be restricted to a very few cases—cases associated with dystocia from obstruction; a few cases of placenta previa centralis and in cases occurring in primiparæ with small vagina and rigid os." Now this teaching practically reduces the recommendation to a minimum, for in cases of dystocia from obstruction the section must be done because of the obstruction; the cases of placenta previa centralis, as compared with the whole number of cases of placenta previa, are infrequent, and while it is possible to have a case of placenta previa with rigid os, in a primipara, the cases are so few as to make them negligible in this discussion. Williams, quoting from the statistics of Doranth, based upon 30,796 labors, states that placenta previa occurred in only 0.17 per cent. of the primipara, and obstetricians of large experience will tell you that in almost all cases (in all the 25 cases that I have observed) of placenta previa the os is relaxed and softened to such an extent that the constant danger is laceration, if great care is not exercised in the extraction of the child. If these things are true, how careful we should be in advising an operation which is applicable at best to very few patients and which must not be attempted save by men of great operative ability and under ideal surroundings. But in spite of these facts it still remains that quite a number of leading obstetricians, at home and abroad, within a few years have written papers advocating section as the safest of all methods of treatment, both for mother and child, and laying especial stress on the greater chances of life for the infant. The number of cases reported are yet too few on which to base any conclusion, but are notably deficient in encouragement as regards infant mortality. In addition, it may be said that such statistics are misleading, for without exception the operations have been performed under exceptional circumstances, by men of high technical training and should not be used in comparison with other published statistics; but even then they do not show any decided gain. The comparative statistics of Döderlein (*Zentralblat, für Gynak.*, Vol. xxxvii, pp. 1381-1913, of the result in 5,615 cases of placenta previa, treated in German Maternities, by various methods, show a combined maternal mortality of 8% and a fetal mortality of 54%. When we come to analyze these statistics we find 309 cases treated by rupture of the membranes show a maternal mortality of 0.9% and a fetal mortality of 25%, while 146 cases treated by Cesarean section show a maternal mortality of 8.9% and a fetal mortality of 30%. True, E. P. Davis reports (*Journal A. M. A.*, 1914, LXIII, 296), 17 cases of Cesarean section with no maternal mortality but a fetal mortality of 40%—but compare this small number of cases with the report of Stratz (*International Abstract of Surgery,* vol. 21, p. 188, August, 1915), covering 173 cases treated by the Braxton Hicks method with a maternal mortality of 0.6 of one per cent. (maternal mortality due to embolism) and a fetal mortality of 33% (children dead before treatment was instituted not counted).

Can we hope to get better results than Hoffmeier with 37 cases, or Behm with 35 cases, or Zwiefel with 62 cases, or Hauck with 18 cases, all treated by the Braxton Hicks method with no maternal mortality? If, then, we can show no distinct gain for mother or child by Cesarean section even while the operation remains in the hands of the skilled operator, in well equipped hospitals, have we not everything to fear if the operation shall be undertaken by men of small experience and in hazardous surroundings? But there is still another consideration: if the operation is done successfully, both for mother and child, the danger to the mother is not yet over, for the line of incision often leaves a permanently weakened uterine wall; so there is much truth in the dictum of Cragin (*New York Medical Journal,* July 1, 1916), "Once a Cesarean, always a Cesarean," for in each subsequent pregnancy there is great danger of a ruptured uterus. This is no empty fear, as many such ruptures have been recorded and Asa B. Davis in reporting six such cases explains their occurrence by the delay in bringing the woman into the hospital, after the inception of labor, and hence the delay in repeating the section.

Considering the subject in all its phases I cannot feel that Cesarean section is to be recommended save in a very few cases of placenta previa and then must be attempted by only a limited number of experts who must operate under ideal conditions. It can never come into general use in the treatment of such cases because of the multiplicity of inherent dangers and because placenta previa is always an emergency and must be treated as an emergency. There is little hope of much improvement in the fetal mortality since the child is most often immature. There is great hope of improving the maternal mortality by prompt action. As soon as the diagnosis is determined the treatment should begin. There must be no delay except such as is absolutely necessary for preparation. We must not try to wait until the child is viable. The time lost while repeated hemorrhages occur, repeated examinations are made and repeated tampons are applied mean a constantly lowered resistance and almost certain infection for the mother. If the child is viable the Braxton Hicks method should be chosen, bringing down a leg to act as a plug that may be pulled upon if necessary to restrain hemorrhage. Pulling on the leg as little as possible, but allowing spontaneous delivery of the shoulders, with prompt delivery of the after-coming head offers the child the best chance for life and is fairly safe for the mother. If the child is non-viable then all that is necessary is to rupture the membranes freely, evacuating as much as possible of the amniotic fluid and await spontaneous delivery. Happily, central placenta previa is the least frequent of occurrence, lateral or marginal placenta previa is much more common and so one usually controls the bleeding as soon as the breech is brought down into the os or the evacuation of the waters allows the head to come firmly down on the placental site with every pain.

After all, however, no matter what the treatment the results in placenta previa are largely due to the skill and judgment of the doctor in charge, the energy and promptitude with which the emergency is met, and the surroundings which attend the patient.

NITROUS OXID ANALGESIA AND ANESTHESIA IN OBSTETRICS.

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The artificial induction of analgesia and anesthesia to prevent physical suffering incident to the treatment of wounds and the performance of surgical operations is not an idea of recent origin; on the other hand, there exists abundant evidence indicating that it is a practice of great antiquity.

The anesthetic effect of nepente was mentioned by Homer (11th century B. C.); Herodotus (500 B. C.) referred to the Scythians inhaling vapors of hemp to produce intoxication; the analgesic action of mandragora was emphasized by Dioscorides, Pliny (1st century A. D.), and others of that era; a physician in the third century (Iloa-Tho) administered to his patients a preparation of hemp whereby they were rendered insensible during surgical operations; mandragora was extensively used as an anesthetic by de Lucca (13th century A. D.); Shakespeare repeatedly referred to anesthetizing draughts; amputation was performed (Meissner) upon a Polish king (1782) while narcotized.

The analgesic and anesthetic properties of nitrous oxid gas when inhaled were discovered by Davy (1800), who suggested: "As nitrous oxid, in its extensive operation, seems capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place." Faraday (1818) demonstrated that inhalation of ether vapor induced anesthetic effects similar to those of nitrous oxid, and Long (1842) used ether for the induction of anesthesia during surgical operations. Wells (1844) had a tooth extracted while under the influence of nitrous oxid. Morton (1846) employed ether for surgical anesthesia; Simpson (1847) first used ether as an analgesic in obstetrics; Flourens (1847) proclaimed the anesthetic effect of chloroform. The suggestion of Davy (1800) was apparently forgotten for over half a century, i. e., until Andrews (1863) advocated nitrous oxid gas with oxygen to induce analgesic and anesthesia.

Much has been written concerning the relative safety of the various drugs for the induction of analgesic and anesthesia by inhalation. The dangers attending both chloroform and ether have been thoroughly exploited and emphasized. Both drugs have been extensively utilized in obstetrical practice, and the dangers of each are about equal in this class of cases. The deleterious effects upon the kidney and lung from prolonged administration of ether are too familiar to require repetition; likewise, the effects of chloroform upon the cardiac, respiratory and hepatic mechanisms are well known. Both are distinctly unsafe in obstetrical practice, where to prevent physical suffering analgesia usually has to be continued for an average of two hours. That the dangers of these drugs by inhalation were recognized by older obstetricians is evidenced by their teaching—that "the least possible quantity of either should be used." In addition to the immediate and remote dangers incident to their administration, both drugs are objectionable and ineffective, because insufficient amounts to induce analgesia, and quantities sufficient to induce anesthesia, are equally potent in defeating the object sought to be attained, i. e., in either event the expulsive efforts of the prospective mother are markedly minimized, labor is retarded unless instrumentally completed or pituitrin administered, and complications are thus favored. In this connection, the suggestion seems pertinent that the administration of pituitrin is not always devoid of danger.

Not very long ago I was requested to administer the analgesic to a primipara for a prominent obstetrician in this city, and he insisted upon chloroform being used; the administration was continued for three hours, and as a logical consequence violent chloroform poisoning ensued. The patient remained in a precarious condition for several months, but finally recovered. It seems probable that many fatalities have occurred from the remote effects of chloroform and ether administered during childbirth. The prevailing popular belief that "chloroform never killed a woman in labor" has been proven a fallacy; and the same may also be said concerning ether.

The method of attempted induction of analgesia in obstetrical practice devised by Steinbüchel (1903), the so-called "Frieburg method" of Gauss (1906), the "Twilight Sleep" or "Painless Childbirth" of the laity, i. e., by the administration of scopolamine and morphine, is merely mentioned for the purpose of condemnation. Certainly the combination of opium and hyoscine cannot be said to have a single valid indication as an analgesic during childbirth; and more important still, the administration of such drugs is dangerous and their effects uncertain. It is unfortunate that the so-called twilight sleep was given such wide publicity through secular channels. This method of attempting to secure obstetric analgesia has been pronounced a failure by eminent obstetricians after thorough trial, and has now been practically abandoned.

Nitrous oxid gas and oxygen appear to have been first employed in obstetrics by Klikowisch (1880), who reported twenty-five cases in which this method of inducing analgesia was utilized. He used eighty per cent. nitrous oxid and twenty per cent. oxygen, and stated that three or four inhalations rendered uterine contractions painless without obscuring consciousness, that contractions were oftentimes stimulated, and in no instance were they diminished in frequency or force.

Subsequent to 1880 the employment of nitrous oxid and oxygen analgesia in obstetrical practice was apparently forgotten until revived by Webster (about 1905), who used the method in operative obstetrics where ether and chloroform were contraindicated. Since then the field of usefulness of nitrous oxid has been rapidly extended until it is now quite generally employed in surgical, gynecological and obstetrical practice. It has long been known that nitrous oxid gas is the most volatile of all inhalation anesthetics, that it acts most quickly, and its effects are dissipated most rapidly. It was the knowledge of these facts which caused the popularity of "laughing gas" in the practice of dentistry.

Properly administered by a competent anesthetist nitrous oxid is undoubtedly the safest and most effective of all the inhalation anesthetics; otherwise there are reasons for believing it may be the most dangerous. An expert can prolong its administration indefinitely without danger to the patient, the gas being non-poisonous and non-toxic, provided a proper admixture of oxygen be allowed. It has been tritely stated that "no individual can be starved so long as sufficient food be allowed to sustain life," and with equal propriety it may be said that "no individual can be killed with nitrous oxid gas provided sufficient air be permitted to maintain life." It must be remembered, however, that the administration of gas alone may quickly produce death from acapnia or asphyxia. It is estimated that in the hands of experts, not one death should occur in five million administrations.

It so happens that I was the first to employ nitrous oxid gas in Louisville for the induction of analgesia in obstetrics. That was during the month of September, 1914, the case being a private patient delivered at the Jewish Hospital. Analgesia was continued for two hours. Since that time I have used gas to the exclusion of other analgesic and anesthetic agents in every obstetrical case which has come under my personal observation, and also when called upon to administer an analgesic under similar circumstances for others, excepting when for some good reason the apparatus could not be transported, or the attending obstetrician insisted upon chloroform or ether being given.

For the induction of analgesia, it has been my habit to employ only nitrous oxid gas and air, by the intermittent method; oxygen in the required amount is substituted only when anesthesia is desired, the air being then discontinued. This method has been followed in a large number of cases, and no unfavorable effects have been noted upon either the mother or the child, analgesia being continued for periods ranging from thirty minutes to three hours. The gas is withdrawn between pains, the patient remaining perfectly conscious. Nitrous oxid and oxygen have also been successfully used during the last few years to induce anesthesia for a great variety of obstetrical operations, including the Cesarian sections, instrumental deliveries, versions, trachelorrhaphies, perineorrhaphies, etc. In such cases a small quantity of ether is also given to secure complete relaxation if needed.

The administration of gas is usually commenced during the second stage of labor, or so soon as the pains become sufficiently severe to cause suffering, and under the analgesic effect cervical dilatation may be completed if necessary. By this method the second stage is materially shortened, the patient undergoes no physical suffering, the cervical musculature is quickly relaxed, the natural pains of labor are not retarded, the expulsive efforts of the patient are increased rather than inhibited, and the completion of labor is thus greatly facilitated. If the gas be properly administered consciousness is not obscured, although the analgesic effect is sufficient to obliterate physical suffering, and the mental status of the patient is restored to normal within a few minutes after completion of labor. The gas is quickly eliminated without deletrious effect upon either mother or child. No maternal nor fetal cyanosis has been observed in any case; and there has been absolute freedom from post partum hemorrhage and other unusual complications.

A few words may be permitted as to the most suitable apparatus: After careful examination of the various instruments now being manufactured for the purpose, I have come to the conclusion that the small apparatus devised by McKesson especially for obstetrical work is the most practical, because of its small size, light weight, portability, etc. The older patterns are too cumbersome for easy handling, and are therefore unsuitable for obstetrical cases outside of hospitals. The McKesson outfit is so light that it may be easily transported from place to place, it can be used to equal advantage in the hospital or the home of the patient, and in consequence is especially adapted to the class of cases under consideration.

An objection which has been urged against nitrous oxid analgesia in obstetrics is the additional expense incurred, which must of course be borne by the patient. Greater experience and care in administration have demonstrated that the cost is less than has heretofore been believed. For instance, I have been able to keep the patient continuously in an analgesic state for three hours with one cylinder (100 gallons) of nitrous oxid, the cost of which as we know is $2.25. Therefore, we are well within the margin of safety if we charge at the rate of $1.50 per hour, for the gas, and this does not seem unreasonable when the advantages accruing to the patient are considered.

When called to administer nitrous oxid in an obstetrical case, to be on the safe side I always take two full cylinders of gas (100 gallons each) and one cylinder (40 gallons) of oxygen. Thus far, however, one cylinder of gas has been sufficient, the longest period of administration having been three hours.

From the foregoing it would appear that in nitrous oxid gas we have a safe and efficient analgesic which is worthy of general adoption in obstetrical practice, and one which clearly refutes the biblical proclamation that "in sorrow thou shalt bring forth children," although the credit for painless labor has hitherto been claimed by Gauss and his "Dammerschlaf."

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Rectal Examinations During Labor.

Too frequent vaginal examinations, "ironing out the perineum," must also be condemned. The danger of such manipulations is in the installation of mild infections which later lead to invalidism. Occasionally such a mild infection leads to fatal pulmonary embolism, and again a virulent sepsis results. For these reasons the rectal examination should be substituted for the vaginal in nearly all cases of labor. It is astonishing what may be accomplished by the rectal examination, and it requires very little practice to acquire efficiency in it. I have conducted the majority of my cases by means of this method of exploration.—Joseph B. De Lee in *The J. A. M. A.*

PRESENT DAY INDICATIONS FOR OBSTETRICAL FORCEPS.

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It might at first glance be considered an anachronism to propose, anywhere except in the class room, a discussion of the forceps. An obstetrical career extending over thirty years, two-thirds of which time the writer was engaged in teaching midwifery, however, has demonstrated, sad as the admission becomes, that no surgical instrument is more often wrongly used, (unless the currette alone be excepted) than forceps.

The forceps, which Baudelocque hailed in his apostrophe as the most useful surgical appliance ever invented, has never been generally understood by the medical man, and through inexpert, careless or hysterical application, it is today the cause of much infant mortality or, worse, of serious mental defect, and also more maternal injury than the operator dreams of being able to inflict.

A few years ago Prof. Sinclair, of Manchester, came over and told the Canadians that the obstetrician simply provided material for gynecology through unskilled use of midwifery forceps. Of course he was speaking in hyperbole, as is any other writer who makes a strong point by generalization, still both advocates to any cause are entitled to a day in court.

It is not necessary to go back to the day of the Chamberlens to find examples to substantiate the charge of Sinclair. In that age it was a mystery, and the accoucheur might creep unannounced into the lying-in chamber and hastily drawing the instrument from the folds of his gown, apply it and escape, leaving the obstensible attendant in charge. Or, Chamberlen not having the benefit of the pelvimeter, Mauriceau could in the case of his celebrated dwarfed subject proposed for demonstration, make good his prediction of failure to deliver, because Mauriceau was a close clinical observer and could conclude that any delivery per *vias naturales* would be impossible, in such deformity as was encountered in that subject.

Even in our boasted twentieth century when obstetrics is so much better taught and mannikin practice drilled into every student's course, innumerable cases come to light of fractured fetal skull, injury to the infant brain and resulting imbecility and to the mother a chain of grief, from deep lacerations to fractured pelvis and ruptured uterus.

An instance which occurred some years ago in the city where the writer lives, resulted after the operator had borrowed forceps, which he unfortunately applied, and after bracing his foot against the bed rail, pulling against the helpless victim held by two women assistants, who grasped her shoulders, he finally achieved a result. The attendant being of two hundred pounds weight, with the strong counter support of the neighbor-assistants, finally succeeded in breaking the ramus by his efforts. He fell back on the floor and the baby spattered against the opposite wall. It is needless to say the final report of this case included two deaths.

The good doctor in Tristram Shandy might well have related this incident in his story to Uncle Toby of the child which was ejected from the womb like the ball from the cannon.

It is unnecessary to multiply awful examples, but no art is perfect except that the failures are used as a text in the evolution of the science on which the art is based.

It is, therefore, worth while to carefully consider whether, as my friend Rudolph Holmes says, "obstetrics is a lost art." It cannot be gainsaid that in the day before forceps came into use, the art of version reached a degree of mechanical expertness which it has not since enjoyed. It is also a melancholy fact that in view of the popular craze for cesarian section we are liable to see this operation carried to the extreme suggested by one of the faculty of the University of Kansas, who proposed to come to Kansas City to have his wife delivered by section simply to avoid the pain which the ordinary labor would involve, the patient being perfectly normal and the foetus L. O. A.

On the other hand, the forceps is not as frequently used as formerly. During the past year at the Kansas City General Hospital forceps was resorted to in but two cases out of 276 deliveries; cesarian section was done four times. However, the great point which must be constantly borne in mind is that the forceps is to be considered whenever a condition threatens the life of mother, child, or both, and that the instrument can be used to terminate labor without great danger to either. The forceps is indicated only when the head of the fetus presents occiput anterior, or can be rotated to the anterior. The head must be engaged 2-5 of an inch at the brim and further progress stayed. The cervix must be fully dilated or dilatable. The blades must be fitted to the sides of the head of the child, the only relation in which tension can be made without fetal injury. In other words, the most essential element of technical skill in using forceps is the ability of the attendant to determine the maternal diameters, the cephalic presentation, the relative size of the fetal head and that the head and pelvic diameters approximate each other so that the delivery may be effected without serious injury to either patient. Unless these conditions prevail it is not a case for forceps.

Forceps is not indicated with a head freely movable above the pelvic brim nor is it desirable with a head lying persistently in the occiput posterior, except to effect rotation before the faulty position becomes fixed. Forceps should under no other circumstance be applied.

The relative danger to the child in an attempt to deliver in case of a non-rotated occiput posterior is most formidable. Much of the criticism of neurologists and pediatricians as to injuries to the infant brain resulting from forceps is to be attributed to the fact that the position of the head is not accurately known and the delicate structures are thus subject to great traumatism resulting in permanent mental defects if not in the loss of the life of child.

Hence let it be understood that no attendant at labor should attempt forceps delivery unless he has had a large amount of mannikin drill and also clinical experience under a qualified teacher in the use of forceps and is so accustomed to diagnosis of the diameters, the position of the head and the degree of engagement, that he is positive of the mechanical problems which are to be faced.

No doubt the most dangerous application of forceps is the premature attempt to effect delivery before engagement and before complete dilitation of the cervix. It cannot be denied under such circumstances that injury is practically universal.

The assertion that resort to forceps is ever done simply as a means of saving the time of the attendant is so atrocious that I believe it to be a charge that could not be sustained.

It is not the object of this paper to be more than a suggestion. Forceps delivery like any other art, must be individual. It must be acquired and the only way it can be so much the possession of any operator as to be his own, is to have him know first the anatomy, next his diagnosis of position at the inlet must be accurate, and next he must have secured that facility of technic which makes him master of the situation.

When do forceps and pituitary extract come into competition? It is only when, given a multipara, the head is in the cavity and L. O. A., there is inertia and stasis at the outlet; a dose of pituitrin will often save the need of forceps, but it is to be borne in mind there is no watchful hand at the helm in pituitrin as there is in a low forceps extraction, and the danger of excessive effort at expulsion may result in deep laceration. Pituitrin is not without its own dangers. Two cases have recently been related to me where, being used in primiparae before dilatation, death of the fetus resulted with no other apparent cause than the drug.

As to comparative value of forceps and cesarian section, the argument is perfectly clear. The section is indicated in any instance where with failure of maternal efforts there is no engagement, if there appears danger to mother (rapid exhaustion, hemorrhage, signs of rupture of the uterus, eclampsia) or to the child (a pulse of over 150 or under 110, discharge of meconium in a head presentation or rapid convulsive fetal movements.) This would include tedious occiput posterior cases as well as instances of the fetal head in anterior position failing to engage and where signs of maternal exhaustion are evident.

When the teaching of obstetrics reaches the Utopian period that each man graduated has that *tactus eruditus* and appreciation of the facts, that he can make an accurate diagnosis of presentation, position and degree of engagement, and he is able to apply forceps exactly to the sides of the head and to the head lying in position where the case is one for forceps, not for version nor for cesarian section, this branch of the art of the accoucheur will be placed on a plane properly its own and it will not be in competition with any other procedure.

PRENATAL DIAGNOSIS, THE MAJOR NEED IN OBSTETRICS.

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In my opinion the science of obstetrics is nearer definite exactitude — standardization — than any other specialty of medicine, and that the art of obstetrical practice, including all confinements, shows the poorest attainment of all the specialties in medical practice.

If every pregnant woman could be carefully studied at the seventh month, again at the eighth month, and confined under hospital facilities by an expert in both the science and the art of obstetrics, an improvement of something like fifty per cent. in maternal and fetal undesirable results would be attained.

Given a sufficient opportunity in prenatal diagnosis, it is a small per cent. of approaching complications in pregnancy that cannot be predicted, and with foreknowledge a large per cent. of the evils that would occur under last minute diagnosis could be avoided—by an expert.

So startling a divergence between our attained science and our art in the medical specialty that holds the largest relation to life and health, should compel serious consideration.

No medical graduate should be considered obstetrically capable who cannot make accurate diagnoses of maternal pelvic dimensions and fairly accurate estimates of fetal head dimensions at whatever time in pregnancy forceps traction will accomplish the delivery of an uninjured child and mother, nor a proper operator who cannot skillfully apply his knowledge.

To obtain the best results in cases of pelvic insufficiency or fetal over-sufficiency, one must foresee the "indicated" method of delivery, whether premature induced labor, forceps traction without the aid of fetal head molding, or with it, version, Cesarian section, pubic section or craniotomy.

The vast majority of confinements always have been and probably always will be in private dwellings, with little preparation in advance for a major operation. All the more is it needful to foresee the entire procedure. With the time of labor set by the indeterminate will of Nature, the physician cannot be sure of proper assistance. The conscientious obstetrician should, if he has opportunity, determine the mensural relation of fetal head to maternal pelvis at the seventh month—particularly in primiparae, in order that he may judge while there is time if it is best in the given case to make an early induction of labor, for this procedure's scope lies between viability and full term. With patients whose delivery at full term with forceps is doubtful, and who will not or cannot be environed with proper major operative skill and outfit, a forestalment of the necessary weeks, promises best results. In most medical discussions of procedure the argument follows the idea of the best method by the best qualified, but in most obstetrical cases neither of these desirables is present. As between induced labor and severe forceps traction—with possible failure with the forceps—and with practitioners of moderate skill, the former will average the best results. But this implies accurate early prognosis.

Inasmuch as quite a large proportion of women do not "engage" a physician until perhaps in labor, or are cared for by midwives, to secure the advantages of early diagnosis our lines of effort must be through general education of women, to making early diagnosis a household maxim. And as to those women attended by midwives, the state would be well within its powers in conservation of human life if it included in the license to midwives as much legal persuasion as possible toward making early diagnosis by a physician the custom.

The drama is an old one, and unfortunately still "running," of the physician fretting over a "delayed" labor, perhaps giving ergot or pituitrin, or rupturing the membranes, to expedite the confinement and let him go hence, and when the uterus has spent most of its energy charge, or the waters have drained away, or the vagina become dry and edematous, he finally discovers that the pelvis is contracted. The forceps are applied to an unengaged head, traction is wrongly made by holding the handles too far back against the perineum instead of by pressing downward with the right hand at the junction of the shafts; the perineum is mashed apart before the head is upon the pelvic floor; the head fails to engage; the existence of fetal life is in doubt; perhaps version is undertaken; a safe major operation is rendered unsafe, even if one could be sure of a viable fetus, and the tragedy of craniotomy provides the climax of the perpetual drama of unpreparedness.

The pages of literature on cesarian section could make an unbroken ribbon over the entire length of the Lincoln Highway, but vastly more lives will be saved from extinction at the threshold if more emphasis and statistical investigation could be given to the number of women confined in homes or in hospitals, with or without early diagnosis by experts or average practitioners.

Malpositions sometimes do not develop until the uterine contractions of labor begin, but most of them are established and the trap of trouble set for the unwary in plenty of time to be discovered. Many such can be corrected before labor, and most of them adjusted in the beginning of labor. Prenatal diagnosis is again the essential factor in the argument. Twin-pregnancy is not difficult of diagnosis. Prolapsus funis should very seldom cause the birth of a suffocated child in prenatal diagnosis.

Central implantation of the placenta, even though no prenatal hemorrhage has raised the obstetrical semaphore sign of danger, can usually be recognized before labor—at least by an expert.

Eclampsia is a treacherous disease, but most destined cases can be thwarted through careful attention.

Although ectopic pregnancies seldom reach the later months with a living or dead fetus—abdominal pregnancy, the latter is not difficult of diagnosis. No special advantage is here secured by early diagnosis except a little more time in which to select the day for abdominal section and to prepare the patient, but this is well worth gathering incidentally in the net of general custom of early diagnosis.

Abnormal conditions of the pregnant woman, such as anemia, valvular and other heart defects, abdominal tumors, gonorrhea, tuberculosis, constipation, hernia, uterine fixation and various other deviations from perfect health, lengthen the list of advantages in early diagnosis.

The above citations are scarcely more than a captional glossary of the lines of application of prenatal diagnosis, but they are sufficient to show why the science of obstetrics, though best standardized of all the specialties, and though most poorly applied in its practice, is nevertheless capable of immense improvement in this best-known and poorest-applied specialty.

The remedy lies in efficient ante-partum clinical training, not instruction but training, of every medical student before he is granted a license to practice medicine, and in furthering such public approval of maternal and infant life conservation as will secure better care of the pregnant woman than the innate irregularities of labor supervention and the unsatisfactory reimbursement of obstetricians now offer.

Thirty years ago few medical graduates began obstetrical practice with any tactile obstetrical experience. Today most colleges require a minimum clinical training, but it is still far from producing expert antepartum diagnosticians.

I spent many years in personal clinical instruction of undergraduates and physicians in obstetrics, and while they mostly looked upon labor demonstrations as the chief feature of the course, strenuous effort in developing their skill in ante-partum diagnosis and labor forecast was considered the more important by their teacher.

The medical profession has not taken the lead as it should in the advancement of the broad lines of public endeavor in life conservation. It has concentrated disproportionately upon the evolution of medical science in its application to its members as individuals.

We have been content in obstetrics to be good obstetricians with *our* patients, the women who could pay for our services, leaving a large per cent. of all confinements to midwives. The midwife is a daily growing anachronism. Better from every point of view, in public health economies and obstetrical capability, that the state provide capable medical obstetricians to care for the poor through pregnancy, than leave them to the midwives that can never be educated to the obtainable standard of efficiency.

Over half the confinements in Newark, N. J., (52 per cent.) are in charge of midwives. Here is a large field of obstetric service that is practically under the old régime that lets Nature take her course, and it is the special function of obstetrical science to improve on Nature, which is always wasteful to an extreme degree. Instead of trying to make good obstetricians out of midwives, a hopeless endeavor—or trying to handle this field of life conservation through public health management by physicians—would it not be better to bring this clinical field into a college or hospital control that would both give to these women a scientific care, far above their midwife service, and also provide increased opportunity for training medical undergraduates in obstetrics.

An organization of hospital and outdoor obstetrical service—the head specialist, well-trained assistants, trained nurses and successive classes of students, with daily opportunity for dispensary ante-partum individual instruction in diagnosis of all details, and the regular staff in supervision of the students caring for women in labor at their homes, combine to give these women a high degree of service while providing all the women who will be cared for by all these students in their later medical practice the degree of obstetrical skill that every woman should receive.

To overcome the existing gap between our advanced obstetrical knowledge and laggard clinical attainment, we must labor to make the midwife yield place to the clinico-educational organization, educate pregnant women to seek medical examination early, and permit no medical student a license to practice without proven attainment in the *art* of obstetrics.

RECENT PROGRESS IN OBSTETRICS—A REVIEW.

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It has been said that there is nothing new under the sun. If we are to interpret this as meaning new discoveries relating to the methods of making babies or to radical departures from the old methods of bringing them into the world, then I am bound to say amen to that statement, so far as the practice of obstetrics is concerned.

If I were to ask whether there has been any progress in the railroad industry during the last few decades one would say that there has been a great advance. Yet we must admit that there is no change in the direct manner of moving cars. It is the same old principle of a steam engine pulling a train of cars after it. But you will say that transportation by rail is at present much safer than of yore; that it is accomplished much more rapidly and with infinitely less discomfort than in former years; that the engineers feel more responsibility and hence must be of a higher type than formerly; that the conditions of operating railroads are far in advance of those which our fathers and mothers enjoyed.

This same reasoning applies to the practice of obstetrics. It is the same old manipulation of bringing a babe from there to here. But there is a difference in the manner in which we do it. We conduct our labors with greater safety and infinitely less discomfort; there is far more cleanliness and obstetricians are of a higher type; and they appreciate, more and more, the great repsonsibility resting upon them and their reputations.

But a few years ago, when I insisted that it was criminal to conduct a labor without the use of rubber gloves, the country practitioners said that I was "high-toned" and that I could never practice obstetrics in the country. Today, when I mention rubber gloves, at the meetings of the county societies, there is no more joking. Nearly all use them.

Therefore I am not wrong when I say that obstetrics *has advanced* and I am justified in presenting this review.

I shall not record all the new things published in the many journals during the past year but rather present my own impressions of the advance in obstetric art, formed by a careful perusal and consideration of the *current* literature. It is but proper that I disclaim entire originality in this paper.

There has been a tremendous awakening of interest in obstetrics. This is explained in several ways. First, the public is becoming educated to the fact that delivery of a babe is really an operation of major importance and that it should be conducted with the same aseptic scruples as an operation for appendicitis. And we are getting a much better class of men from the colleges. Second, the field for specialists in this line is almost a virgin one, having been so long neglected. Why was it so long neglected? Because it was formerly considered a medical practice. Today, obstetrics is considered in the light of a surgical procedure.

This is a surgical age, and hence, when the young practitioners see surgical opportunities in the practice of obstetrics, they rush for it as young chicks scramble for their corn. It matters not that they have had no special training for this work. They feel that they are prepared to give a spectacular show and make a reputation by performing Cesarian sections at every opportunity. *They dislike obstetrics but love to operate.*

The pratice of obstetrics is not confined to forceps deliveries, Cesarian sections and perineal repairs. It offers opportunities for the application of the principles of each and every branch of the practice of medicine. I cannot understand how one can call himself an obstetrician unless he is able to recognize the opportune moment when he needs to apply the special branch of medicine indicated in that specific case.

Obstetrics is a *concrete art*. It consists of that part of each separate branch of medicine which may apply to the successful management of conception, gestation, parturition and the puerperium. One cannot know which one of the special divisions of medicine he can best avail himself of, in an obstetric emergency, unless he has paid special attention to the art of midwifery. Hirst defines obsetrics as that branch of medicine which treats of the physiology and pathology of conception, gestation, parturition and the puerperium, with all the complications and pathologic consequences of the childbearing act at all periods. It embraces therefore a study of all the diseases peculiar to women. If one will analyze this definition he will be impressed with the far-reaching importance of the study of midwifery. He must conclude that, to be a successful obstetrician, one must be versed in medicine, surgery, gynecology, orthopedics, anatomy, physiology, and all the allied branches, and must know when to apply the principles peculiar to each branch. In fact, no branch of medicine can be more peculiarly a concrete art.

In view of the above it seems to me a little strange that certain practitioners do habitually call a surgeon to assist them in obstetric emergencies. In my own practice, I find that a very small percentage of my obstetric work is of a surgical nature. My work is confined to consultation and one would expect more surgical cases under the circumstances. The largest part of my consultation cases are patients suffering with heart, lung or kidney disorders complicating pregnancy; also vomiting, nervous diseases, and conditions which, while not demanding immediate surgical attention, complicate the gestation so much as to cause alarm. I am in the habit of calling to my assistance specialists in the various branches of medicine and profiting by their experience and advice before resorting to surgery. In the practice of obstetrics it is well to be first an obstetrician and then a surgeon. But this is a surgical age.

One phase of this subject that has received more than ordinary attention during the last year is the prenatal care of pregnant women. I do not refer to the absurd delusions regarding special diets to reduce the size of the fetus, nor to the various lotions and prayers which are used to change nature and appease the Almighty, but to the common sense regimen prescribed by our best obstetricians. The pregnant woman should receive special attention regarding exercise, good nutritious food, and sensible well-fitting corsets; her dress should be sane; her teeth should be looked after. The absurd fear that certain dentists show, when a pregnant woman presents herself for repair of her teeth, would be laughable if it did not do so much harm by causing these women to neglect the care of their teeth at this time. Kidneys and bowels, breasts and nipples, eyes and ears, nose and throat, should be looked after.

If the expectant mother has appendicitis or gallbladder or kidney affections which are causing enough trouble to bring them prominently to her notice they should be operated upon before they light up and cause greater trouble at the most critical period. She should be measured so that she will not struggle without avail until too late for surgical relief. But it is well to remember that many a babe has come joyously through a pelvis which seemed short in one or more diameters.

It is also well to remember that Young and others have shown that one Cesarian section does not necessarily preclude the next babe being born by the natural path. I have had several patients on whom a Cesarian section was performed, who gave birth to a second child without resort to any surgical measures. In such cases the judgment of an obstetrician is far better than that of a surgeon.

The relation of bad obstetrics to diseases of women has been a fruitful subject for discussion during the last year. It is in this field that we have really made splendid advance. We are now thoroughly aware that we may have cases of puerperal sepsis even though we lose not a single parturient or puerperal woman. In the past many physicians did not consider a woman infected unless she died or was left a cripple.

Physicians are driving more automobiles than formerly. What has that to do with sepsis? It seems funny that this should have any bearing upon the number of cases of puerperal sepsis, does it not? The reason is that autos do not have hair and glanders and do not make manure to be shoveled away. Thus, you see, if a doctor has rigid scruples *against* washing his hands when attending a labor, there is less danger of infection than formerly. But they *are* washing their hands. The young undergraduates are attending our local medical societies' meetings, and when they go home to practice obstetrics the women will gossip about Dr. Blank's new-fangled ideas and he will get the business. You can not teach an old dog new tricks, but you can make him jealous. Like Shakespeare's young lover, he begins, in his second childhood to brush up and look pert to meet the competition of the new aseptic Adonis who makes few vaginal examinations and has clean hands.

Thirty years ago the death rate of obstetrics was enormous, and until that was reduced its morbidity was a comparatively unimportant matter. Today the death rate in obstetrics is low, and so far as we can see at present, as low as it is likely to become, but the amount of obstetric ill-health is still large, and most of it preventable and unnecessary. The improvement in this respect which should be aimed for, and should be attained, is rendered difficult by the fact that the evil results may appear long after the confinement, and even though they be directly due to it, are too often unconnected with it in the mind of the obstetrician. It is a known fact that unrecognized minor obstetric infections are responsible for much of the pelvic ill-health of women. These infections occur most frequently among the community at large, and are not rare among the better classes, or in the practice of well-trained men, yet even the minor infections are well nigh eliminated from surgery. An eastern writer says that the contrast is a marked one and at once raises the question, How far are we justified in blaming the obstetrician for this difference? At first the fault would seem to be theirs. A closer analysis will, however, refer it to an essential difference in the conditions under which the two kinds of work are done.

What chance has the *poor* parturient woman for aseptic service? I refer to those living in the average city of 100,000 or less. There is no place to which she can be taken unless the attending physician is on the staff of some teaching hospital. Many times the hospital refuses the case on account of the scarcity of *charity* beds in the average charity hospital. You will say that these are cases for the clinics. Well perhaps they are. But can you not imagine a circumstance that might cause the young and ambitious practioner to wish to retain his cases? These patients might be able to pay a little and this little may mean a great deal to the young physician. Or this case might have connections of a nature which might mean future good business to this young practitioner. What we need is hospitals which will take these cases for ten dollars a week, without adding another ten dollars for dressings and extras, and allow the practioner to attend his own cases.

I want to see municipal hospitals to which *every practitioner* can take his charity cases and not be obliged to turn them over to some professor. These cases might be used for teaching purposes but the delivery is to be made by the attending physician.

If you are a chief of staff or hospital superintendent you will say that your statistics will suffer from such a plan and that your death rate will be increased. Well suppose that this is true. Are we running hospitals and clinics for the collection of statistics or for the benefit of the general public and the education of the students of medicine? Does it not occur to you that even if the death rate or morbidity rate of your hospital does increase a little, the relative decrease in mortality and morbidity in the community at large will be greater? If you are as keen to improve the practice of obstetrics as you pretend, do you not think it would be a good idea to pass the improvement around instead of selfishly keeping all the betterment within the grasp of a few professors and staff men? Don't you think that the average accoucheur who is not in the habit of conducting his labors according to the aseptic technic seen in hospitals could learn something if he had the chance to deliver his patients in a place adapted to such work? It is about time for the professors to stop scolding the family doctor about his crude methods and give him a chance to do his work under the same conditions as do those who criticize him. And, did you ever notice the technic of some of our professors when they are thrown amid surroundings such as the general practitioner meets in his everyday work? To my mind the sepsis problem will be largely solved when we have more maternities for poor women. To be sure, it is impossible to relegate all cases to hospitals even if we had them. The women of the better class will not and the poor cannot always leave their homes. But infections will be as rare in obstetrics as they are in surgery only when both can be conducted under like conditions.

The modern gynecologist believes that a very large proportion of the cases he is called upon to treat are the result of past infections; many chronic inflammatory states which were formerly attributed to other causes now are recognized as secondary to pre-existent infections. It has been my experience, as it has others, that many of the women whom I examine give a brief history of not feeling well since the last labor, that the menses have been uncomfortable and that there has been transient attacks of pain and abdominal tenderness. Upon examination one or both tubes are enlarged and inflamed, and this condition explains all the symptoms.

It was formerly the custom to refer all doubtful cases to a hypothetical gonorrheal origin. I know surgeons who still do so. This superstition is much less prevalent than it was. Now the profession is recovering from its hysteria on this subject and has begun to consider the rôle of *puerperal* morbidity in the production of pelvic ills in women. More careful study of case histories has made it clear that a large proportion of the chronic pus tubes which were formerly loosely considered gonorrheal are in fact obstetric in their origin.

Regarding the treatment of puerperal sepsis I can say that there has been nothing particularly new advanced during the past year. Many are the theories and many are the remedies offered for the quick and sure cure of puerperal sepsis, but the fact remains that all treatment is directed toward conservatism and we note that surgery, sera and specifics are displaced by fresh air, good nursing and brains. These points were fully covered in my article on puerperal sepsis published in this journal about one year ago.

I believe that the greatest discovery and the greatest boon in obstetrics, in recent years, is pituitary extract. At first, like all new things, it was pooh-poohed and reviled by those who having eyes see not and having ears hear not. Pituitary extract has done more to reduce the morbidity of obstetrics than any one agent now in use. By shortening labor, it has almost done away with forceps deliveries. One must not think that pituitrin takes the place of forceps. But by shortening the time of delivery in normal cases, the accoucheur who has more work than he can attend to decently is not tempted to apply forceps unnecessarily in order to get away and save lives which he thinks no one else could save. Thus we have less infection, less torn perineums, less invalid women, less deformed children and less deaths. The action of pituitrin is almost human. You would think that it knew how much damage the meddling accoucheur was producing by repeatedly introducing his fingers into the vagina of the parturient. So it crowds the head down upon the perineum in the shortest possible time and thus actually prevents him from putting his fingers into the vagina so often or for long periods. Thus is sepsis forestalled.

But *pituitrin must be used with brains.* It may be just as dangerous as it is useful. Pituitrin must not be given until the os is dilated and the head is molded. If given before that time there is danger of rupture of the uterus. This has happened more than once. To be effective it must be given hypodermatically and deep into the muscle tissue. One of my friends who claimed that pituitrin was of no value injected it just under the skin of the knee. He might just as well have rubbed it on the sole of the foot. Pituitrin is rendered absolutely inert by alcohol and this should be impressed upon the nurse so that she will remove all the alcohol from the syringe barrel before filling with pituitrin. Morphine is an absolute antidote for pituitrin and by its use we may stop the action of this drug at any time we choose. I do not know that pituitrin is an antidote for morphia but I have been told that Cushing is experimenting with the use of morphia in the treatment of patients suffering with pituitary diseases. If used too soon pituitrin may be responsible for secondary uterine hemorrhages, also blue or dead babies. It is criminal to give large doses of pituitrin when the pelvis is so small that the head cannot possibly pass through; or when the child is so large as to become impacted; or when there is a faulty position which will not right itself; or when there is a neoplasm obstructing the birth canal. I deny the right to use pituitary extract until one has made a complete bimanual and pelvimetric examination. *Pelvimetry and pituitrin go hand in hand.*

But, said a country doctor to me some time ago, how can we be weighted down with additional instruments such as a pelvimeter when practicing in the country? I suggested that he leave his obstetric forceps at home and carry a pelvimeter and thereby lessen the load upon his shoulders as well as upon his conscience. Pituitary extract is of value in the diagnosis of labor. This does not mean to inject a full ampule of this drug into every woman who has a few pains. If you do this and then repeat one or more times you will have either a ruptured uterus or you will get the cumulative effect of the entire dosage of pituitrin, all of a sudden, as soon as the cervix starts to dilate. Then you will have everything torn to shreds as soon as the head descends. Instead of allowing the head to mold you will force it through the bony passages with resulting fracture of the skull. It has been said that an ax in the hands of a fool is a dangerous thing; but who will deny that the ax was a valuable tool in blazing the way for present day civilization. The same applies to pituitrin. This drug must not be used in primary uterine inertia, or in eclampsia, or in cases where there is an abnormal thinning of the uterine wall. I cannot agree with the majority of writers who say the pituitrin should not be used in cases of placenta previa. I admit that rapid dilatation of the cervix is most dangerous from the standpoint of hemorrhage. But when we note that this drug acts selectively upon the muscle fibers of the fundus, we will see that the head is crowded down against the placenta and thereby exerts pressure upon it and controls hemorrhage in about the same manner as we expect from the Braxton-Hicks maneuver.

One of the greatest single advances in obstetrics during the past year is the regulation and standardization of the dosage of pituitary extracts. Bandler, Schwartz and other workers have shown us that we were using too large doses. They have demonstrated that small doses, repeated as often as necessary, is the proper technic. By administering five minims at a time we secure gentle but steady contractions of the womb. If necessary this dose may be repeated in one half hour and again as often as needed at half hourly intervals. Thus we do not have nearly so many lacerations and the infants are born in better condition. The mother does not suffer so much and secondary hemorrhage is not seen.

Pituitrin has proven of great value to me in obstetric operations. A full ampule administered just before dilating the cervix, preparatory to emptying the uterus, causes the womb to contract while I am operating and assists in evacuating the secundines. This technic lessens the hemorrhage to a great extent and minimizes the danger of perforating the uterine wall with instruments. It also assists involution and thereby lessens the danger of sepsis. I invariably administer a full ampule of pituitrin as soon as the child is delivered when performing Cesarian section, either abdominal or vaginal. This gives rapid contraction and more perfect involution and prevents the uterus filling with clots which make good soil for infection. Pituitrin is a great addition to obstetric therapy.

The next subject which I shall mention, in passing, is one which perhaps has been long ago relegated to the scrap pile of passing fancies. What shall I say about that arch fake, twilight sleep? I use the term twilight sleep in a general application. As the old preacher said that brethren embraced the sisters, so will I say that my discussion will embrace all such deceptions of advertising and other misnomers, no matter at what hour of the day Morpheus may be worshipped. Not even the most enthusiastic advocate believes or can say that twilight sleep causes painless labors. They say that it causes the mother to forget her pains and not be averse to having more children. If you are an honest practioner and are not using questionable methods to increase your business, you must admit that Nature causes every mother to forget her pains as soon as delivery is accomplished. You know that this is true. Then why inject into a mother something that you know to be unsafe and which you cannot take away once it is administered? Do you think that anyone in the average town in this state administers real twilight sleep? I know that not one of those practitioners who tells his patients that they are receiving twilight sleep is telling them the truth. How can they give it when there is not one hospital in Ohio equipped to offer the proper carrying out of the Freiburg technic? I know of one eminent obstetrician who says that he uses this method and yet he is so busy that he misses being present at quite a few confinements for which he has been engaged. Anyone who has read or studied the technic of administering twilight sleep must at once recognize the manifest absurdity of such procedures when offered as the real thing. These accoucheurs merely inject a dose or two of morphia, and perhaps scopolamine, and call that twilight sleep. Those men who are guilty of this deception are plainly dishonest to a woman who has entrusted herself to them at the most critical period of her life. It is not possible for me, at this time, to quote all that has been written for and against this much advertised technic. Suffice it to say that a large majority of honest and careful obstetricians are against its employment and there has been an increasing number of editorials in the leading journals denouncing this method as unsafe and unscientific. At the last meeting of the Association of Obstetricians and Gynecologists, held in Pittsburg, twilight sleep was denounced in no uncertain terms. It was said that a physician who entered a home, fully equipped to administer twilight sleep, was more dangerous than a Zeppelin loaded with bombs. Safety first is a good slogan.

The treatment of placenta previa has not changed much in the last year. There are those who insist that Cesarian section is the best method of dealing with this condition and there is an equal number who are just as strenuously opposed to this procedure as formerly. It seems to me that this matter must be met with the application of brains. The method followed, in many cases, seems to depend either upon the consultant's knowledge of obstetrics or his ability to perform a surgical operation. If he does not operate, he always advises the Braxton-Hicks method. If he is one of the surgeons who thinks that a few weeks in a post-graduate school makes him an obstetrician, he always advises Cesarian section. I advise that you *keep in the middle of the road* and be careful of ruts. I would advise that every aspiring obstetrician read the article by Holmes in the November, 1915, issue of *Surgery, Gynecology and Obstetrics*. It is a classic.

As I said before, I cannot, in the limited space allowed me, discuss all the various phases of obstetric advance. But I could not close without saying a few words about puerperal eclampsia. Every journal is well supplied with new methods for treating this disease, if it be a disease. Each week we read a new theory explaining the etiology of eclampsia. And our patients keep on dying without regard for the method of treatment used.

Do you know what eclampsia is? I don't. Neither does anyone else. If you don't believe me read the journals and text-books. Some time ago I noted, in the *Journal of the American Medical Association*, under State Board questions, the following: "Give the causes, symptoms and treatment of eclampsia." Thinking that this was my chance of being enlightened upon this important subject, I wrote to the secretary of the board in question and asked him to refer my letter to the examiner who asked the above question. I had written a most courteous letter, admitting my ignorance, and requested him to tell me how he expected the question to be answered. In reply, I received a long letter in which he scolded me for my ignorance and saying that I had insulted him. As I had already admitted my lack of eclamptic intelligence I could hardly take exception although I am certain that I did not mean any offense to the gentleman. An abstract of his letter is about as follows: "You say you don't know what is eclampsia. You don't know what is life, or death, or electricity, or air, or space, but they are, ain't they? Why don't you buy a dictionary and then you would learn that it comes from the Greek and means to explode, hence eclampsia means explosions, in medical terms convulsions." Now this seemed funny at first, and then sad. But honestly, how much more do you know of eclampsia than he has stated in his letter? I will say, however, that if he can be certain that it always comes from the Greek I am in favor of limiting immigration.

Seriously, what is eclampsia? You are inclined to treat all cases of puerperal convulsions as though they were etiologically the same. I insist that such is not the case. We must not confound uremia with eclampsia. Yet this is done by some of our best men. You may say, well what is the difference, the treatment is the same. That is not true. The treatment of uremia, namely, sweats, catharsis, etc., so successfully used in that class of case, is not necessarily the treatment of eclampsia. I have talked this matter over with men like Martin Fisher and they agree with me. You do not know what eclampsia is. Just because you cure a case of uremia by the above methods there is no reason to believe that you can cure eclampsia by the same methods. We have uremia in non-pregnant women, but we do not have eclampsia in this class. Eclampsia is a disease of pregnancy, but we don't often cure the eclampsia by removing the fetus. It will be noticed that some will recover and many will die no matter what method of treatment is used. We should learn to differentiate between uremia and eclampsia.

My own modest theory of the cause of eclampsia is as follows: There is a disarrangement of coordination between the physiologic actions of various organs of the body, caused by pregnancy. This is due to the elaboration and absorption of some toxin and is manifested by convulsions. We do not know whence this toxin comes, although many of the best and most recent investigators trace its formation to the placenta. The removal of the fetus does not always bring these organs to normal coordination and the convulsions may continue until death occurs either from exhaustion or toxemia. In fact, removal of the fetus is often followed by increased severity of the disease.

In a recent article appearing in the Cincinnati Lancet-Clinic, Dr. Martin Fisher gives a splendid discussion of eclampsia. He says that eclampsia is caused by a toxin. The symptoms are not manifested until the system is saturated with the poison. If we remove the fetus we may stop the elaboration of toxin but we do not remove the toxin already ravaging the body. If the poison has not already overwhelmed the woman the removal of the fetus may save her life. He compares it to typhoid fever, in which disease we have no knowledge that the patient is ill until the toxin has so completely overwhelmed him that he is prostrated. But if the intoxication in eclampsia is severe enough, the shock and strain of the removal of the conception may be enough to finish the work and the woman will perish. Thus we may explain why so many women continue to have convulsions after delivery at term. Or if a parturient has not had any signs of eclampsia until after delivery and then becomes suddenly eclamptic, we may say that she was saturated with the poison and that it took but the strain of delivery to give us "the straw that broke the camel's back."

In order to have a patient seriously affected with eclampsia it is not necessary to have albumin in the urine. Fisher shows that it may affect certain centers in the brain without causing a nephritis. Or the nephritis may be secondary to brain involvement. Or, in some cases the kidneys may be first involved. I have seen a good many cases of eclampsia without any urinary symptoms and I have seen many cases in which there was a great deal of albumin in the urine go to term with no untoward symptom. In Vienna they were using the Stroganof treatment the last time I was there. What they will be using next year will depend upon the one who is conducting the clinic. A few years ago when I was there they were saying that injections of oxygen was the real cure. So you see I am not unkind when I say that you don't know what eclampsia is or what will cure it. I believe, however, that our treatment is becoming more conservative among the better class of obstetricians.

Cesarian section has become the method of choice for eclamptics at term. The vaginal route, whenever proper, seems to find favor among the leading obstetricians of the country. For the routine treatment of eclampsia you may follow any method that suits your fancy. Some will get well and many will perish no matter how you treat them. *There can be no prophylaxis because we know not the cause.*

There has been some improvement in the treatment of vomiting of pregnancy. Here again we have many theories and many treatments but do not know the etiology.

Hirst has done some good work with corpus luteum extract. I have tried this in a number of cases but too few to assure me of its efficacy. The use of blood serum has given some men good results but this condition is so different in different women that I would want to see a report covering at least one hundred consecutive cases before I could become enthusiastic about any of them.

In Ohio, the new laws relating to "babies' sore eyes" and the regulation of the nursing profession are noteworthy advances.

The subjects of forceps deliveries, post-partum hemorrhage, abortion and allied matters have been handled about as of yore except that the best men are all drifting toward conservatism.

The Abderhalden test has not been popularly accepted on account of its intricacy and because it has not been proven to be a specific and infallible test for the diagnosis of pregnancy or any other condition.

In conclusion, the advances in obstetrics during the past year have been along the lines of cleanliness, conservatism and better preparation of those practicing the art of midwifery. The one disappointing feature that I note is that there has not been a great enough increase in the facilities afforded for the clinical teaching of obstetrics. The only exception is the opening of the splendid Magee Maternity in Pittsburg.

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WALTER M. BRICKNER, M.D., Editor

New York, November, 1916.

THE NEWER GYNECOLOGY.

During the last two decades the tendency on the part of medical practitioners to pursue a specialty has become more and more manifest. It is but natural that there should at this time set in a reaction which should restore the dignity of the internist to its former place of importance in the medical profession. The great contributions, however, of specialized medical and surgical study that have marked our generation have been almost epoch-making and it would be futile to condemn specialization. The only fair criticism is, perhaps, that the movement has over-reached itself; and the most important lesson we have learned is the fact that the specialties cannot be concerned with single isolated organs or groups of organs contained within certain anatomical boundaries. We can no longer consider the uterus as lodging within it alone the cause of the various functional disturbances, the irregularity in quantity and in the periodicity of the menstrual flow. We have long since abandoned the belief in the purely mechanical causation of gynecologic symptoms. Careful clinical observations, and findings during gynecologic operations, have taught us the "adnexorganogenic" causes of disturbance in uterine function. We do not think of dysmenorrhea, of metrorrhagia, menorrhagia, amenorrhea, oligomenorrhea or even sterility as due to itemized pathological conditions of the uterus alone. We do not longer ascribe a host of symptoms, regional and remote, to the deviations from the norm of the position of the uterus with respect to the pelvis and to its own anatomical portions.

This is not the place to review the numerous ways in which our conception of gynecologic pathology have undergone newer and broader modifications teaching us to avoid doing this or that operation for the correction of so-called pathological alterations in gross anatomy. We need only mention the revolutionary change in our notion of endometritis, and of the numberless times curettage must have been avoided through the newer and more rational doctrine of the cyclical changes taking place in the endometrium. Likewise with the retro-and antedeviations of the uterus, the retroversions and retroflexions, the anteversions and anteflexions. We do not in all conscientiousness ascribe backache and sterility of comparatively recent date to a retroversion which may have been congenital or have existed for a long time. We know by liberal allowance that these symptoms do not obtain in many women who have retrodeviations of the most extreme type. We will pass over the discussion of the numerous procedures devised to overcome so-called malposition of the uterus, and maldevelopment of the cervix. Rational criticism has been applied to gynecology in the past decade in a way to bring the genital tract of women in relation to the whole organism and the rest of the component tracts and systems of organs.

Formerly the only contact between gynecology and internal medicine was at the operating table or in considering operative contra-indication. Was the patient in a condition to stand operation, that is, were the heart and lungs in tolerably good condition, were the kidneys functionating properly or was there diabetes? It was learned by bitter experience that certain cardiovascular, renal, pulmonary conditions and diabetes were in general unfavorable to the desired result expected from operative interference. While these contraindications were well recognized and were taught we were at the same time still nurtured in the notion of "reflex association" of symptoms resulting chiefly from mechanical pressure. Who has not been taught to associate retroflexion chiefly with backache, dysmenorrhea with "conical servix," uterine hemorrhage with endometritis? Progress in our knowledge of gynecologic diseases has increased in proportion as we have endeavored to correlate it with general visceral pathology on the one hand, and as we have kept pace with the advances in general medicine on the other hand. Not only is cardiac decompensation a contraindication to serious gynecologic operation but in it may be seen the cause for disturbance of gynecologic function. For example, the menorrhagias associated with chronic valvular disease have become well known. On the other hand, large fibroid myomata of the uterus induce definite changes in the myocardium. The amenorrhea and oligomenorrhea secondary to pulmonary tuberculosis and chronic pyemia are well known. Advantage has been taken of the aid offered by the Wasserman reaction in clearing up certain gynecologic symptoms which were hitherto obscure.

The relation between chlorosis and dysmenorrhea, for a long time noted, has received new interpretation since greater attention has been called to the rôle of the ductless glands in connection with genital function. The metabolic diseases which by themselves were believed to have an important influence on gynecic physiology have in the light of the doctrine of the interrelation of the endocrinal glands received a different and more amplified interpretation. Psychic shock has been accorded a definite place as a cause for gynecologic disturbance. The various psychoses of women have received new tests as applied to coexisting gynecologic pathology. The so-called sympathetic changes which the whole material organism undergoes during pregnancy if nothing else should have served to impress upon us the vital and most intimate interconnection of visceral physiology, normal and perverted. We are called upon to coordinate our clinical knowledge covering the whole organism with what we have long since categorized as the various items in the domain of gynecology.

It is not sufficient for the gynecologist, though he be called upon for a verdict only as to this or that refinement in diagnosis, to say there is a fibroid tumor, or a cystic ovary or a retroflexion or a pus tube; *it becomes equally important to evaluate the symptom or symptoms of which the patient complains, and to determine whether they may properly be ascribed to the pelvic finding. Moreover, he should have sufficient clinical experience to be able to indicate what cause or causes may be operative within other than the genital organs to explain the symptoms.* It should not be deemed presumptuous on the part of the gynecologist if, failing to find definite pelvic pathology he ventures the diagnosis of typhoid fever, of pyelitis or malignant endocarditis or even of uremic conditions.

An attempt to correlate genital pathologic function with diseases of other organs and systems of of organs, while dating perhaps from previous decades has only recently found expression in monographs dealing with this newer scope of gynecologic disease. The two volumes forming supplements to the Nothnagel system have been devoted to setting forth "The Diseases of the Female Genitals in Relation to Internal Medicine" being a collaboration of the pupils and associated of the late Alphons von Rosthorn to whom this work is dedicated. The interactions of gynecologic disease and general medical affections have thus been stated concretely so that their reciprocal rôles as cause and effect might be properly understood and recognized. Following this monumental work American authors have begun to incorporate in their text-books chapters dealing with this newer phase of gynecology.

The scope of the gynecologist has therefore enlarged considerably. He has been obliged to add a very important factor to his special task. He must not merely continue to strive for greater expertness in the accurate diagnosis of local gynecologic disease and correct local medical and surgical treatment. Gynecology has in the newer sense come to include all the pathological alterations incident to the sexual life of woman. Blair Bell has introduced the term *"sex complex"* to denote the correlation of the internal secretions and the sex functions. The "genital system" according to the same investigator includes remote endocrine glands as well as the genital organs which stand in definite relationship. The further study of the endocrine units in this "genital system" is of the utmost importance to gynecologists. It is of no less importance to internists. In this department of medical research the aspirations and interests of both gynecologists and internists are practically the same.—I. C. Rubin.

THE CURETTE.

This popular little instrument, which is in the armamentarium of nearly every practitioner and is familiar to every medical student, looks so innocuous that one can hardly imagine that any risks attend its use. But the prevailing notion that one man can curette the uterine cavity as well as another is not shared by the gynecologist, who recalls fatal results that followed the simple operation in pre-aseptic days and cases of perforation of the organ in his own practice, to which he looks back with no little chagrin.

It is one thing to use the curette and another to know when to use it. How many of us during a routine curettement have a clear mental picture of the mechanical insult to the endometrium and the reparative process which follow?

That more harm was not done by the older generation was doubtless due to the fact that Thomas had popularized the blunt curette with the flexible shank, and that it was a routine practice to apply iodin and carbolic acid to the raw surface afterward. We did not understand the reason why iodin was so valuable as a prophylactic, knowing only its astringent and hemostatic action. I have often thought that the uterus has been under a special Providence, so tolerant has it been of the introduction of unclean instruments. But, after seeing several patients die of septic peritonitis I was so impressed with the possible risks that I always laid down the rule to my students: Never introduce *any* instrument into the uterus except under the same aseptic precautions that you would adopt if performing an operation upon the organ.

But it is superfluous to dwell upon aseptic technic, which is so familiar. As I said before, it is far more important to know why one curettes than how he does it. The latter is easily learned by the tyro; the former is the result of long experience and observation—in pathology, as well as in gynecic surgery.

It seems to me that the intelligent use of the sharp curette (which is the only effective kind) is a true index of modern surgery or, in fact, of progressive medicine in general. Formerly we were satisfied to treat symptoms; now we look beyond them to the *cause.*

The old saying, "When in doubt, open the abdomen," is now recognized as a coarse, mechanical method of trying to cover up one's ignorance. Unfortunately when the operator picks up a curette he is apt to apply this outworn advice. If he has any doubt (which is rarely the case) he curettes whenever he divulses the os internum for stenosis or anteflexion and as a preliminary step before trachelorraphy or amputation. Indeed it is only after a vigorous campaign of protest on the part of specialists that the cautious practitioner has learned to withhold his hand in cases of acute endometritis, whether septic or specific, and to give the phagocyte a chance. The curette has been a veritable fetish and it is time to stop and look at all sides of the question.

The old idea that uterine hemorrhage (typical and atypical) and sero-purulent, or purulent, discharge were positive indications for the vigorous use of the sharp curette is a relic of the mechanical theory of the older school, to whom "endometritis" was the explanation of these symptoms and the ablation of the "hyperplastic tissue" the cure of the "disease." Clinical and pathological studies have taught us that the explanation is based entirely on apparent rather than hidden causes. As a matter of fact there are so many cases of uterine hemorrhages that are not relieved by local treatment that we are beginning to be more careful about our promises of cure after curettement.

I have been amazed to see how many practitioners resort to the curette in cases of oligo- and amenorrhoea (true homeopathic treatment!) without stopping to think that the trouble is not with the endometrium at all, and how uniformly they promise to cure an obstinate leucorrhea with the curette without investigating its bacterial origin. *When in doubt don't curette* is a safe rule. Doubtless the diagnostic use of the instrument is its most valuable, for one should always exclude intra-uterine conditions before looking for general, or so-called "functional" causes of meno- and metrorrhagia, but to attack the endometrium roughly with the sharp curette merely as an experiment is unscientific and is sure to bring the operation (and gynecology as a science) into deserved disrepute. We all know this, because we all fail to relieve our patients as we have promised.

If we find to our surprise, after divulsing the cervix in an unmarried woman with obstinate menorrhagia, that the endometrium is normal, let it alone. There is some occult cause—ovarian, faulty innervation, hematopoietic—which we have not discovered. We shall not help her by curetting. That is only common sense, but we do not seem to adopt it. As soon as the average man introduces a curette into the uterus he is unable to resist the temptation to scrape. Moreover, even when we have removed a teaspoonful of "granulations" we frequently fail to relieve the bleeding, because we have not attacked the real cause.

All this seems trite, but it is worth remembering, for it has been learned only as the result of many failures and promises unfulfilled.

The elder Flint never uttered a wiser caution than when he insisted on the constant observance of the old dictum: *Non nocere.*

Let us not regard the curette with the "familiarity that breeds contempt," but with more respect as a two-edged tool that requires careful handling. H. C. Coe.

Surgical Suggestions

Bleeding from the uterus in a woman past the menopause urgently requires curettage. *The curettings should be examined for carcinoma.*

Leucorrheal discharge comes from the cervix, not from the body of the uterus; therefore curettage is useless. Local treatment of the cervix may improve the condition.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

Obstetrical Standards and Results.

In the *American Journal of Obstetrics*, July, 1916, Barton Cooke Hirst pointed out that the women of our country suffer from inadequate obstetrical attention not countenanced in foreign lands. The shortcomings of our obstetrical system are well known. The remedies for them are largely in the hands of the medical pedagogues of this country who are responsible for the obstetrical training medical men have received, are receiving, and will receive in the future.

It is insufficient to point the finger of scorn at midwives and to decry their existence at a time when the accumulated figures apparently indicate that the services afforded by midwives in normal cases are by no means inferior to those given by physicians.

It is a comforting thought, in a sense, when one reviews the history of American obstetrics, that the annual number of children born in this country is constantly decreasing. In fact, in 1900 there was only ¾ as many living children to each 1,000 potential mothers as in 1860, despite the fact that infant mortality has been decreasing.

What is the toll that obstetrical procedures takes annually? In 1914 the puerperal state was reported as the cause of death for 10,518 women of whom 4,664 died of puerperal septicemia. These figures, it must be remembered, merely represent those secured for the registration area of the United States, which includes 66.8% of the total population of this country. In addition to these direct losses of women, there must be charged up 5,716 infantile deaths, due to injuries at birth. The 28,270 deaths because of premature birth must be considered, though the responsibility of lack of obstetrical attention for this cannot be established. In the consideration of the infantile mortality, it must be recalled that still-births are entirely rejected.

The interest in social distress and economic pressure would be more keen if obstetricians fully realized the baneful results to family life, incident to the death of the mother or, what is more usual, to the disabilities consequent upon puerperal accidents, such as lacerations. The mere loss of life is sufficient to attract attention, but the disabilities subsequently developing are fraught with more serious evils to the mothers.

The relation of the number of puerperal deaths to the general public health problem will probably be more appreciated by a realization of the fact that the puerperal state was causative of a greater mortality than typhoid fever, measles, scarlet fever, whooping cough, dysentery, meningitis, or cirrhosis of the liver. If to the death of mothers are added the deaths of children from injuries at birth, the total loss of life is greater than from any of the diseases above mentioned and exceeds the number of deaths from diphtheria and croup, diabetes, diseases of the arteries, atheroma and aneurism, etc., suicide or old age.

Even these figures do not tell the entire story of the obstetrical deaths, particularly as there are no available figures to point out the fetal or maternal death rate following abortions. Priestly, writing in 1887, estimated that one abortion occurred to every four pregnancies. A special Committee on Criminal Abortions in the State of Michigan estimated that approximately 1-3 of all the pregnancies throughout the country ended in abortion, which they believed approximated not less than 100,000 yearly. The financial costs and social distress and moral effects of this large number of abortions are beyond approximation.

Modern gynecology on its surgical side is resplendent with achievement. The extent to which surgical procedure is required for the restoration of women to normal after childbirth is an indictment of the medical profession, in so far as their responsibility for obstetrics is involved.

It is generally stated that children are the wards of the state. Upon this theory, it properly becomes the duty of states to take every possible step to protect child-bearing women from incompetent obstetrical service. The unnecessary hazards of pregnancy and labor can be reduced. The fact that they are not at a minimal point would indicate that there has been a marked failure of the state to place the proper emphasis upon licensure for midwifery. It will not be possible to eliminate death nor to do away with mutilation and consequent disability, but it is most probable that more adequate attention to obstetrical training in colleges will serve to reduce these anti-social effects.

The Council on Medical Education recommends that 180 hours be devoted to the study of obstetrics, exclusive of the time necessary to take charge of 6 labor cases. The Association of American Medical Colleges has no higher standard for practical work but demands that students witness at least 12 cases and personally take charge of 3 women during the period of pregnancy, labor, and the puerperium. These standards are low. They are insufficient for giving proper obstetrical experience to medical students.

Under our present system of medical education and licensure it is still possible for poorly trained men to take up the practice of medicine. The sad effects of their unscientific and ineffective training are particularly manifested in the unsatisfactory results of their practice upon parturient women and infants.

The very beginning of life presents the finest opportunity for manifesting an earnest, conscientious, social spirit. If this were recognized by the medical profession, particularly that part of it whose particular interests are limited to the specialties of obstetrics and gynecology, they would make concerted action for the improvement of obstetrical training in our medical colleges. It is possible for physicians to institute their own reforms.

If the preliminary qualifications for the practice of obstetrics are too low, the remedy lies in raising the standards. If practical experience is too limited, the problem may be solved through devising greater opportunities for supervised practical obstetrical work. In the last analysis, the responsibility of obstetrical work in this country rests upon the medical profession. The leaders in this movement for the betterment and reform should be the intelligent, capable, trained obstetricians and gynecologists.

Book Reviews

Disorders of the Sexual Function in the Male and Female. By Max Hühner, M. D., Chief of Clinic, Genito-urinary Department, Mt. Sinai Hospital Dispensary, New York City; formerly Attending Genito-urinary Surgeon, Bellevue Hospital, Out-patient Department; Member American Urological Association, American Medical Association, New York Urological Association, etc.; Author of "Sterility in the Male and Female and its Treatment." Small octavo; 318 pages. Philadelphia: F. A. Davis Company, 1916.

In his recently published book on Sterility Hühner gave us a work based on painstaking investigations and original observations. In the present volume he has also embodied his personal experiences in a serious and ample study of the various disorders of the male and female sexual function, omitting the sexual degeneracies. It is a practical little treatise, well written and very interesting, planned to bridge the gap between the neurologists, who have neither the experience nor the facilities for conducting urethroscopic examinations, and the genito-urinary specialists who, occupied with the surgical problems of the bladder, prostrate and kidney and with genital infections, have—most of them—little interest in or sympathetic understanding of these other disorders of the sexual function.

We have found this a very readable book, based on an obviously common-sense as well as scientific appreciation of the pathology and management of the conditions described. These are *Masturbation*, in its various phases in both sexes, *impotence*, organic, functional and psychic, *pollutions, priapism, satyriasis, nymphomania, frigidity, vaginismus, absence of female orgasm, enuresis, consequences of withdrawal and some unusual forms of sexual neuroses.* There is also a very good chapter on continence.

Huhner quotes authorities freely—and disagrees with many of them boldly. He states his own opinions logically and convincingly. Thus, he puts squarely up to the physician the responsibility for the evil consequences of advising or even hinting at sexual intercourse for the cure of masturbation. In his chapters on masturbation he takes a middle ground between those who attribute all sorts of diseases and disorders to this practice, and those who pooh-pooh it as harmless. Hühner regards the continued indulgence in masturbation as a *disease* that is quite curable —chiefly by local treatment, and without the necessity for abandoning continence.

Whether or not those who have studied sexual disorders will agree with all of Hühner's conclusions, they will, as will the profession generally, find interesting and helpful this well considered, sincere and earnest work, based on serious clinical study and written, not as a profound and exhaustive treatise, but as a scientific and sympathetic exposition of the essential factors in the commoner disorders of the sexual function.

The Practice of Obstetrics: Designed for the Use of Students and Practitioners of Medicine. By J. Clifton Edgar, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College; Visiting Obstetrician to Bellevue Hospital, New York City; Surgeon to the Manhattan Maternity and Dispensary; Consulting Obstetrician to the New York Maternity and Jewish Maternity Hospitals. *Fifth Edition.* Twenty-second Thousand. Large octavo; 1,067 pages; 1.316 illustrations, including five colored plates and 34 figures, printed in colors. Philadelphia: P. Blakiston's Son & Co., 1916. $6.00.

The present revised edition contains in addition to the almost encyclopaedic text of its predecessors, new matter on Painless Labor and Twilight Sleep, Pituitary Extract in Uterine Inertia, and the Artificial Feeding of Infants. The same spirit of conservatism in obstetrics is reflected in the fifth edition; it is especially observed when dealing with Twilight Sleep. Edgar's sixth conclusion bearing upon this much agitated procedure in obstetrics is characteristic of his attitude as teacher and practitioner of the obstetric art. "The present is not an era of meddlesome midwifery," he says; "it is an age of conservatism in obstetrics, and surgery as well. Today we obstetricians aim at a natural, a physiological termination of labor. In my opinion, the method under discussion lessens the number of such natural terminations by prolonging the labor, demanding more frequent artificial deliveries, and by occasionally causing the death of a fetus."

The excellence of the text-book needs no further comment. The book has deservedly attained its nation-wide popularity as a comprehensive and modern work dealing with obstetric principles and practice.

A Text-Book of Practical Gynecology. By D. Tod Gilliam, M.D., Emeritus Professor of Gynecology in Ohio State University College of Medicine; Gynecologist to St. Anthony and St. Francis Hospitals; Consulting Gynecologist to Park View Sanitarium, Columbus, Ohio, etc.; and Earl M. Gilliam, M.D., Professor of Diseases of Women in the Ohio State University, etc. *Fifth Edition.* Octavo; 681 pages; 366 illustrations. Philadelphia: F. A. Davis Co., 1916. $5.

The present volume, the fifth revised edition of Gilliam's Gynecology, is with numerous small changes, all chiefly with the view of enhancing the practical nature and value of the text-book, essentially the same as its predecessor. The author still adheres to the plan of not including citations from authorities and of dispensing with bibliographic references. Moot questions have been given scant attention, and scientific methods in classification and arrangement have not been strictly adhered to whenever "in my judgment, a plain connected narrative would render the text more intelligible." Gilliam's own frank statement represents the true plan and scope of his text-book. There is no doubt that he has been faithful to his design. The book reflects the practice and teaching of a practical teacher and gynecologist. Undoubtedly there still are a great many who do not desire to be burdened with the matter which has been excluded from this book. For the *busy practitioner*, but hardly the *student*, this book has a great sphere of usefulness. Especially is this true of the last ten chapters dealing with diseases of the bladder, kidneys, ureters and rectum.

Progress in Surgery

A Résumé of Recent Literature.

Significance of the Ammonia Coefficient in Obstetrical Work. James R. Garber, Birmingham, Ala. *Southern Medical Journal*, October, 1916.

Garber concludes:

1. The imperfect reaction of the maternal organism to the growing ovum is the usual predisposing factor in all cases of vomiting in pregnancy.

2. Reflex or neurotic influences are usually the exciting factor.

3. True toxemic vomiting is accompanied by serious changes in metabolism.

4. A high ammonia co-efficient is merely a danger signal and is always to be considered in connection with the clinical symptoms. This is especially applicable to high co-efficient.

6. A low ammonia co-efficient indicates neurotic vomiting and is readily treated by suggestion.

7. Where there are slight variations of and a persistently high ammonia co-efficient, a positive diagnosis of toxemic vomiting is indicated. When the ammonia co-efficient curve has wide variations, sometimes falling to a low percentage, and is associated with pronounced nervous influences, there is little doubt that one is dealing with neurotic vomiting.

8. Chloroform produces characteristic lesions of the liver, and therefore should not be used as the anesthetic. The best anesthesia is nitrous oxid oxygen.

9. The determination of the non-coagulable nitrogen co-efficient assists in differentiating renal from hepatic conditions. Its chief use is to indicate the extent of renal involvement.

The Role of the Anteposed Uterus in the Causation of Backache and Pelvic Symptoms. Henry T. Hutchins, Boston. *Journal of the American Medical Association*, September 23, 1916.

Hutchins combats the common notion that the cause of low backache and pelvic drag is the retroposition of the fundus, and discusses the anatomy of the parts, and his investigations as to the real cause of the symptoms complained of. He finds it necessary from his observations and studies to consider only one factor, and that is the posterior descent of the cervix. Whether the fundus is forward or backward plays but a minor part in the production of the symptoms. As a result of his studies he has been led to suspend many anteposed uteri in which he found this descent, and has obtained excellent results. He does not advise suspension of every uterus, but he no longer hesitates to suspend one simply because there is no retroposition of the fundus or to suspend a retroposed uterus simply because of that fact. He pleads for the recognition of a neglected class of cases, namely the anteposed uterus in descent causing the symptoms of retroposition, and also for the careful differentiation of cases which need suspension before any operation is performed.

Pelvic Massage. Ferdinand Herb, Chicago. *The New York Medical Journal*, September 30, 1916.

Pelvic massage should occupy a more important place in the diseases of women. Massage is recognized as one of our good palliative or curative measures that are at the service of the body where they are easily accessible. It should, therefore, be of value in pelvic conditions.

Pelvic massage requires a high degree of knowledge and skill, and above all, fingers that are long enough to reach the pelvic organs.

A large percentage of gynecological cases can be successfully treated by massage. Postoperative pelvic adhesions and chronic shortening processes within the ligaments—these conditions particularly offer a promising field for improvement if pelvic massage is properly employed.

Bladder Symptoms in Women with Special Reference to Associated Gynecologic Pathology. I. C. Rubin, New York. *The Urologic and Cutaneous Review*, September, 1916.

Rubin states that out of every ten women suffering with gynecological symptoms three or four at least also complain of urinary disturbances. Many patients come to the gynecologist with bladder trouble as their chief complaint. The symptoms are frequency, dysuria, incontinence (complete or relative), hematuria, and pain.

A careful personal history, and careful physical examination are imperative, as well as the routine instrumental examinations. The important point to be established is whether a gynecological condition be present and whether or not the bladder symptoms are secondary to this condition. The author cautions particularly against the error of blaming a retroflexion or anteflexion for bladder symptoms. All other possible etiological factors should be ruled out before these two conditions are held responsible for vesical trouble.

In addition to the intraabdominal process, which may be the cause of bladder complaint, one must rule out all intravesical conditions including those of the urethra and ureters.

The Extended Operation for Carcinoma of the Uterus. Reuben Peterson, *Surgery, Gynecology and Obstetrics*, September, 1916.

Peterson discusses the relative value of the extended operation for carcinoma of the uterus as an ultimate life-saving measure. Of 51 patients operated upon five or more years ago, 27 patients were alive and well—that is 56.2 per cent. of all cases operated upon—while 69.2 per cent. of all those surviving the operation were alive after five years. The primary mortality from this operation is still quite high in spite of attempts to educate the public with the object of getting cases early for operation. The great difficulty is that the lesion is more widespread than can be determined by the most careful preoperative examination. The primary mortality in Peterson's series of 59 cases was 25.4 per cent. The cautery method in his hands proved valueless except as a palliative procedure in 58 cases. Of 124 cases seen by him in the university and private clinics, Peterson concluded that 36 cases were so far advanced that nothing was done or operation was refused. In spite of the high primary mortality, however, the radical extended operation is the only one, with the possible exception of the extended vaginal operation, which holds out any reasonable promise of a permanent cure. Of his whole series there are 18 patients who are alive and well five to thirteen years after they were operated upon.

X-Ray Treatment of Uterine Hemorrhage. Robert T. Frank, *Surgery, Gynecology and Obstetrics*, September, 1916.

The Roentgen-ray produces amenorrhoea by destroying the ovarian follicular apparatus, or oligorrhoea by partial destruction of follicles. The resulting menopause symptoms correspond in character and degree to those of the postoperative menopause. The choice lies between two methods of application: (a) the fractional, weak, requiring prolonged use, but readily controllable; (b) the intensive—massive, more rapidly producing amenorrhoea. In any event, we are able to exert graded effects upon the ovary, so influencing the menstrual cycle in degrees varying from slight inhibition to permanent destruction of functions. It causes also fibroid tumors to diminish in size or to disappear by directly influencing them. Obstinate cases of hemorrhage in adolescents can be cured by the rays. Only such cases, however, as have resisted all other forms of therapy should be selected for its action. Preclimacteric functional hemorrhages are readily cured by the production of the menopause. Malignancy must, however, be excluded and preliminary diagnostic curettage resorted to. Complicated cases should also be excluded, as serious and sometimes fatal mistakes may occur. In patients with serious heart lesions, nephritis or pulmonary trouble, or in the hyperneurotic, preference should be given to the *x*-rays. In properly selected cases, Frank believes there will be 5 to 10 per cent. of cases of fibroids requiring interference; the choice between operation and roentgen therapy may be left to the patient.

Fetal and Placental Syphilis. By E. D. Plass, *American Journal of Obstetrics*, October, 1916.

In a study of 75 placentae, Plass concludes that: (1), the syphilitic placenta is characterized by increased weight and size, abnormal proliferation of the stroma cells and an obliterative endarteritis and endophlebitis; for practical purposes the changes are specific and offer very strong evidence of the presence of fetal syphilis, whereas their absence does not exclude the disease. (2) The demonstration of the *treponema pallidum* in the fetal tissues affords an absolute diagnosis of lues, but the failure of demonstration proves nothing. (3) There are many discrepancies between the histopathological findings in the placenta and fetal tissues and the maternal Wassermann reaction and complement-fixation test on the mother is of less value in accurately diagnosing fetal syphilis than the other two methods. (4) The diagnosis of fetal syphilis should be attacked from all points and absolute reliance should not be placed upon any one method of diagnosis.

Cystitis Senilis Feminarium. By Frederick R. Charlton, *Surgery, Gynecology and Obstetrics*, October, 1916.

Cystitis Senilis feminarum is a name given by the late Dr. Charlton to a condition of the bladder peculiar to women who have long passed the stage of menopause. The ages of the patient suffering with this condition are nearer 70 than 50. In one out of 50 cases in the author's experience the bladder picture as described occurred in a patient of 38 years. But this patient had had one child and had not menstruated for 13 years. Clinically there is undue frequency of urination with tenesmus and burning. Loss of sleep and much worry attend the acute stage which may last from several weeks to months. There follows a stage of comparative comfort. Recurrences are common. The cystoscopic picture is characteristic. Vesiculo-papular elevations, usually discrete on a deeply injected mucosa, more or less sharply defined from the healthy mucosa are to be seen at the height of the attack. The vesicles may become purulent and break. In the interval stage there is a scattered number of flat pigmented and ecchymotic patches. The pathology is probably the same as that of senile vaginitis and senile proctitis. In the author's cases these lesions were almost invariably found associated with the bladder changes.

Puerperal Gangrene of the Extremities. By Arthur Stein, *Surgery, Gynecology and Obstetrics*, October, 1916.

Two cases of gangrene of the extremities are reported by Stein as occurring during the puerperium. In one case one lower extremity became gangrenous following an abortion at 3 months. A foul-smelling fetus was spontaneously expelled; temperature between 104 degrees and 105 degrees for seven days necessitated a curettage which was performed on the seventh day post-abortum. Some placental tissue was removed. Seven days later the patient had pains in right leg and swelling, and three days later coldness, cyanosis and loss of pulsation of the dorsalis pedis artery; in other words, typical beginning gangrene. Amputation of the leg below the knee was imperative and the patient then made a good recovery. The second case was one of bilateral fatal gangrene of the lower extremities ensuing upon spontaneous puerperal infection, the patient having gone to labor at term. According to Stein, 76 authentic cases of puerperal gangrene have been reported in the literature.

The Wassermann Reaction in Gynecology. By Philip F. Williams and John A. Kolmer, *American Journal of Obstetrics*, October, 1916.

The need of routine Wassermann tests in gynecological diagnosis is emphasized by Williams and Kolmer. In spite of negative history and the failure to find other clinical evidence of syphilis, the Wassermann reaction may be positive on one or more occasions and indicate the presence of a latent syphilis which should be treated. Thus in the child-bearing age with a positive Wassermann reaction the patient should receive anti-luetic treatment. This is necessary even though the symptoms complained of by the gynecologic patient may be sufficiently accounted for by a definite pelvic lesion. The cardiovascular changes that have been recognized as associated with fibromyomata of the uterus may in reality be due to a latent underlying syphilis. Routine examination of the vagina and cervix in patients during the early stages of syphilis may reveal a far greater proportion of primary lesions than have been recorded.

In the 300 cases of gynecological and obstetric patients studied by the authors, they found positive Wassermann reactions in 22.6 per cent. This percentage corresponds closely with the generally accepted incidence of syphilis in adults. In still-births the percentage of positive Wassermann reactions was 75, in rectal disease 50 per cent.; amenorexhea, 50 per cent.; habital abortion, 50 per cent.; pelvic inflammatory disease, 36 per cent.; sterility, 33 per cent.; abortion and miscarriage, 29 per cent.; metronhagia, 20 per cent.; myomata of the uterus, 16 per cent.; gonorrheal vaginitis, 10 per cent.; pregnancy, 17 per cent.

Examination of Semen with Special Reference to its Gynecological Aspects. By William H. Cary, *American Journal of Obstetrics*, October, 1916.

Cary has made a very elaborate and careful critical study of the semen in sterility in the light of the work that has been done by others. He emphasized the great percentage of barren marriages in which the cause of the sterility is in the male. To operate upon a patient or subject her to exhaustive gynecologic treatment without investigating the reproductive powers of the husband is neither fair nor scientific. Prognosis must depend largely on the relative potency or impotency of the male whether the deficiency lie in the spermatogenesis or in the act of copulation. The semen is collected in a suitable receptacle, preferably by placing the condom in a small wide-mouthed jar tightly corked and in turn suspended in a larger jar of warm water or in a thermophor. It is to be transported as soon as possible to the gynecologist, who should be prepared to make immediate microscopic examination. Another method, when feasible, is to place the condom into the vagina and prevent its escape by a tampon. It is also of value if the semen is examined by removing it from the vagina, normal coitus having obtained. The high power lens is necessary to examine the specimen.

The determination of efficiency of her spermatozoa depends on the degree of oligospermia, the percentage of imperfect spermatozoa—whether immature or deformed; the percentage of the cells that are motile—whether sluggish or lively; and finally, the length of time activity persists. Complete study must include, before giving an unfavorable prognosis, an inquiry into the physiological affinity of the male and female secretions. Observations show a direct relation between the vigor of the individual and the potency of the semen.

Treatment is generally a genito-urinary problem. A large proportion of cases is improved by measures which better the general health and sexual hygiene. Twenty-five per cent. efficiency warrants artificial impregnation; fifty per cent. efficiency justifies correction of a definite pathologic condition in the female.

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OBSERVATIONS ON THE SURGICAL TREATMENT OF GASTRIC AND DUODENAL ULCER: INCLUDING A BRIEF REVIEW OF RECENT LITERATURE.

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The problem of the surgical treatment of gastric and duodenal ulcer has been fairly well settled. Bloodgood says that in gastric ulcer the surgical treatment among the principal surgeons has advanced very rapidly, in fact is far ahead of the opportunity for its application. This is a very significant statement, and one which indicates that we should search more thoroughly, by means of röentgenological and other methods at our disposal, for the physical signs of gastric ulcer, and in that way only will the diagnosis be perfected and greater opportunities presented for treatment.

Mayo states that on several occasions he has examined the stomach and duodenum through an abdominal incision without finding any evidence of ulcer, and the continued symptoms for some months led to a second exploration when ulcer was discovered. Either the ulcer had been overlooked at the primary operation, or it had been confined to the mucosa and the musculoperitoneal coats were involved later.

It is believed by Paterson that gastroenterostomy is the commonest, simplest and safest method of surgical treatment for ulcer, it affects both the drainage and the chemistry of the stomach, diminishing the acidity by the presence of a small quantity of bile and pancreatin secretion, relieving the pylorospasm and allowing the stomach to empty without irritation of the ulcer by the passage of food. It thus allows the ulcer to heal, and it does so in over 92 per cent. of cases.

According to Graham the class of cases giving the best late results are those where the pylorus is stenosed. Under this class in the Mayo clinic 71 per cent. of duodenal and 67 per cent. of gastric ulcers were cured, and 94 per cent. of duodenal and 92 per cent. of gastric ulcers were cured or greatly benefited.

Woolsey claims that gastroenterostomy is successful in 82 per cent. of cases. He has employed with this three methods of excluding the duodenum, (a) von Eiselsberg's proximal division and suture, (b) Wilms' method of pyloric exclusion, and (c) infolding the pylorus by suture. The more radical operations for gastric ulcer are excision, pyloric resection, and mesogastric resection. Woolsey considers excision unsafe without gastroenterostomy. In pyloric ulcer the Billroth method he thinks the best, and it should be followed by gastroenterostomy; or the Polya-Roechel modification, where the proximal end of the stomach is sutured directly to the jejunum. Where the ulcer is further from the pylorus, the operation of choice is the mesogastric resection or resection in continuity.

Knott states that as the tissue changes attending most chronic gastric ulcers are permanent, and the larger proportion of ulcers of the stomach are "planted on an ulcer base," in every case treated surgically the ulcer should be excised when possible. An additional reason for the radical treatment of gastric ulcer is the fact that about one-third of the cases treated by gastroenterostomy without excision or pylorectomy require a second operation at which one of these procedures should be applied. (This we question). Ulcers situated near the pylorus, on the anterior wall of the stomach, and on the posterior wall even though at times adherent, may in many but not in all instances be excised. Gastroenterostomy must frequently accompany excision of the ulcer, but whenever excision is possible within safe limits, it should be performed and the fate of the patient be not left to gastroenterostomy alone.

Mayo believes gastric ulcer is more serious than duodenal ulcer, but fortunately not so frequent. The large percentage of so-called pyloric ulcers are in reality duodenal. Ulcers in the terminal inch and a half of the stomach will probably be mistaken for carcinoma because of the palpable tumefaction due to edema and muscular hypertrophy. Acute perforating gastric ulcers are less likely to be protected by adhesions and the escape of gastric content will probably be great, readily diffusing itself over the peritoneum. The perforation is difficult to close. Hemorrhage in gastric ulcer is more frequent than in duodenal ulcer and more serious. The large majority of ulcers occur in the terminal two inches of the pyloric end of the stomach, and should be resected, he thinks, after the Rodman method. Ulcers of the lesser curvatures and antrum are best subjected to Balfour's method of cautery excision and gastroenterostomy. In posterior ulcers of the body of the stomach, trans-gastric excision gives good results; but where great deformity exists with extensive adherent ulcer craters of the posterior wall, removal of the entire pyloric end and union between the stump of the stomach and side of the jejunum (end-to-side) is indicated. Hourglass stomach may be treated by gastroenterostomy after Watson; by plastic operation planned after the Finney type of gastroduodenostomy, or by sleeve resection.

Guilleminet and Guerin claim that some surgeons particularly favor annular pylorogastrectomy for ulcers in the lesser curvature even when there are adhesions to other organs. "These ulcers are distinguished by the tendency to bore deep and to pull the stomach out of shape." In two cases reported the stomach had been drawn into a symmetrical hourglass shape and the pancreas closely adherent formed the floor of the peritoneal ulcer. The debility was so extreme that resection and anastomosis were accomplished at two sittings, but they were borne so perfectly that they might have been combined in a single operation. The ultimate outcome in cases of this kind after pylorogastrectomy or mediogastric resection has been most excellent.

Bland-Sutton excised the pylorus for chronic duodenal ulcer in twenty patients. In three of them he had previously performed gastrojejunostomy; in one the symptoms returned three months afterward; in another six years; in a third two years; one patient died. He attributed this unfavorable result to catgut used as suture material. Since the treatment of duodenal ulcer passed into the province of surgery, it had become the routine practice to perform gastrojejunostomy for its relief, in the hope by diverting the chyme through the new stoma into the jejunum the ulcer would heal. If the pylorus is obstructed by the ulcer, the results are usually good, because the chyme must pass through the new stoma; but when the pylorus is patent the chyme flows through it and in some instances ignores the new route. He believed it better where practicable to excise the pylorus with the ulcerated portion of the duodenum and rejoin the stomach and duodenum on the principle of end-to-end anastomosis. If this method could be made safe, gastrojejunostomy for the relief of chronic duodenal ulcer with unobstructed pylorus would soon be abandoned.

Lewisohn devised a modification of Biondi's method for which he claims permanent occlusion of the pylorus, as follows: Gastroenterostomy: The gastrohepatic ligament is ligated in the pyloric region, which enables delivery of the pylorus in front of the abdominal wall. A transverse incision through the seromuscularis is then carried around the pylorus; the muscularis is peeled away from the mucosa which is thus exposed intact for about an inch; the mucosal tube is ligated above and below with silk or Pagenstecher ligature, cut in between the ligatures and the stumps carbolized; the stumps are then buried in the stomach end and the duodenal end respectively.

Ochsner concludes a paper upon the relation between gastric ulcer and cancer with the following summary: (1) In all of the recent or early cancers encountered, the growth was located in the edge of an ulcer; (2) by careful study of the history of late cancer, in which the original ulcer had of course been obliterated by the growth, it was possible to elicit a previous ulcer history; (3) in studying the development of cancers in other parts of the body, a point is usually found which has been subjected to long-continued irritation, as in the lip, face, rectum, or uterus; (4) the fact that there are so few cancers of the duodenum as compared with the stomach may be explained by the fact that while there is stasis in the stomach there is none in the duodenum; in other words, while food containing cancer germs will remain in contact with gastric ulcer sufficiently long to permit the germs to become implanted, this is not the case with the duodenum; (5) it is possible that these germs may require an acid medium to stimulate them to attack the tissues; (6) it is relatively an easy matter to overlook the history of a previous gastric ulcer, because in the absence of severe hyperacidity the pain in these cases is frequently insufficient to be remembered through the great distress from which the patient suffers after the cancer has developed; (7) it is usually found that a large majority of these patients have habitually eaten large quantities of food which was certain to be infected with manure, such as lettuce, celery, radishes, etc., so the introduction of the cancer germ into the open wound of the ulcer could be easily explained; (8) these gastric ulcers are of such long duration that the focus of irritation might readily serve to locate cancer germs which might have entered the circulation through some other portal; (9) this does not indicate that every patient who has an ulcer of the stomach will ultimately have cancer, any more than that every soldier going to war will be shot, but it shows the wisdom of closing this opening for the entrance of cancer by curing the ulcer early and permanently;

(10) much attention should be given to the early history of these cases and to the prevention of feeding unclean, uncooked food.

Wilson found over 60 per cent. of the cases of gastric carcinoma developed on the base of chronic ulcer, and a clinical study showed that 60.5 per cent. of the cases of cancer gave a long previous history of gastric ulcer, 43.8 per cent. a typical ulcer history and 18.7 per cent. a history of irregular gastric ulcer. Payr found 26 per cent. of cancers developed from ulcer in his resected material, and Kuttner 43 per cent.

Boas insisted that the outcome of gastroenterostomy for duodenal ulcer is not always the success generally credited thereto. Re-examination months later will often reveal the presence of occult blood, which is an objective sign that normal conditions have not been restored. Only when the gastroenterostomy banishes occult hemorrhages, so that tests months and years later are persistently negative, can one speak of permanent cure; it would strengthen the position of surgeons who regard gastroenterostomy as a sure cure for duodenal ulcer if such testimony could be adduced. He believes that gastroenterostomy merely provides conditions which facilitate the success of a course of treatment for the ulcer. Operative treatment for recurring intractable duodenal ulcer may be necessary, but to advocate it for every case is going too far, unless evidence can be presented that occult hemorrhages are thereby permanently arrested.

The methods to be employed in the surgical treatment of gastric and duodenal ulcers will depend upon the location, duration and complications of the lesion, and whether perforation or other complication has already ensued. For instance, the treatment of ulcer in the lesser curvature near the cardia would be entirely different from ulcer in the pyloric region; an ulcer on the anterior ventricular wall would be handled in quite another manner from one located on the posterior wall, etc.

The most troublesome ulcers to treat are those near the gastroesophageal orifice, which are anatomically difficult to reach. The prevailing plan is to make a transgastric opening and then treat the ulcer from within by means of the actual cautery.

In the midportion of the stomach the treatment will depend upon whether the ulcer is located on the posterior or anterior wall, or on the greater or lesser curvature. When located on the anterior wall or near the greater or lesser curvatures, the ulcer may be easily excised. Ulcer on the posterior wall may be entirely insusceptible of such treatment. When excision is contemplated, a transgastric opening should be made bringing the posterior wall forward, preferably doing the work from within the stomach. If the ulcer is small it may be successfully treated by the actual cautery. I recall a case where the stomach was filled with blood, where there was no evidence of ulcer by palpation, by plate or fluoroscopically, yet examination of the gastric contents showed active hemorrhage. Only after incising the stomach were we able to find a small hemorrhagic area, which when subjected to cauterization was followed by recovery of the patient.

In the pyloric area where the majority of ulcers occur, one must consider excision of the ulcer-bearing region, resection of the pylorus, and resection of the ulcer, with or without gastroenterostomy. The belief is rather widespread that gastroenterostomy is sufficient treatment for practically all gastric ulcers. I believe often we should go further than that. The duration of the lesion and the complications should in addition to the location determine the procedure to be instituted. Resection of the pylorus and excision of the ulcer-bearing area should probably be done oftener than is the usual custom. Thus "at one fell swoop" we get rid of the ulcer-bearing area, the ulcer itself, and the possibility of future complications. We should always consider, particularly in ancient ulcer with much induration, the potentiality of carcinoma.

I have performed pyloric resections in connection with gastroenterostomy, and in indurated ulcers near the pylorus I have also practiced pyloroplastomy and resection of the ulcer-bearing area without gastroenterostomy, and excellent results have been secured. In other cases I have depended upon gastroenterostomy without pyloric resection.

In duodenal ulcer the operative procedure will depend upon whether the lesion is located on the anterior or posterior wall, and whether it is possible to close the ulcer area by resection. In the majority of cases closure can be effected by suture if the ulcer is not located in the posterior portion of the duodenum. Gastroenterostomy in addition is always necessary.

As to the question of recurrence of ulcer after pyloric occlusion or some other method of surgical treatment which may be deemed more appropriate: I think this is an academic question of little practical importance, because the instances are so limited in which cure of the ulcer is not obtained

The treatment must be viewed from another standpoint: In addition to determining that ulcer is present and operation necessary, we must consider whether the operation is performed early in the presence of little induration, or whether late with much induration and potentially present carcinoma. The latter is probably one of the most important points to be considered at the time of the operation. The fact that the lesion is of long duration does not necessarily imply that there will be a tremendous amount of induration about the ulcer region. I have under observation now a patient to be operated upon within a few days, where the pylorus is almost completely occluded, probably due to ulcer, and which so far as can be ascertained presents no evidence of induration. No mass can be detected about the pylorus, but of course operation may reveal considerable induration present in that area. Exactly what will be the final operative procedure will depend upon what is found after the incision is made.

The other feature which has great bearing upon the exact type of procedure is the complications present, and the amount of glandular implication should be given especial consideration in connection with possible carcinomatous transformation. Without doubt chronic ulcer represents one stage in the development of carcinoma; that has been definitely shown by the investigations of several prominent observers. The glandular involvement does not always indicate that we have to deal with carcinoma, but certainly extensive glandular infiltration, with large indurated masses, even in the absence of definite clinical evidence of carcinoma, must be considered a factor in deciding how extensive the operation shall be, and in finally determining the most appropriate operative procedure,—and I would emphasize the importance of this feature, whether the pyloric obstruction is acute or chronic, we must bear in mind that we are dealing with a precancerous lesion.

So far as I am aware there is no routine method of performing gastroenterostomy in these cases,—in my opinion it practically makes no difference which way the jejunum is directed, whether to the right or to the left; in fact, this is of no importance. The possible sequelæ of the operation must always be considered. We must remember that after gastroenterostomy we may have: (a) acute gastric dilatation, (b) the establishment of a so-called vicious circle, (c) post-operative bleeding from imperfection of the sutures, (d) the occurrence of sepsis, (e) the development of jejunal and peptic ulcers, (f) recurrence of the ulcer with secondary obstruction, (g) wound rupture with hernia.

Another point is that in doing an anastomosis we must be sure that it is made in the upper or first portion of the jejunum. Several cases have been reported where, instead of anastomosis being made in the upper portion of the jejunum, it was made within a few inches of the ileocecal junction. This may be avoided if the operation be not completed with undue haste, and if the jejunum be first identified and then followed backward to the ligament of Trietz. While such errors may be infrequent, the fact that they have been made is worth remembering.

There are two other features in connection with the operation which in certain types of cases may be life-saving procedures. In cases where there is tremendous gastric dilatation, together with pyloric obstruction which may have become practically complete, it is better to do a jejunostomy preliminary to the operation upon the stomach. This is a procedure which is worthy of most careful consideration. I refer particularly to cases with pyloric obstruction, where loss of flesh and malnutrition are prominent accompanying symptoms. The other feature is the two-stage operation in the presence of carcinoma or a tremendous amount of induration which will demand resection of the pylorus. In these we should do first a preliminary gastroenterostomy, which can be done with a minimum amount of danger, and at a later time, say ten days or two weeks, the second or major portion of the operation, i. e., resection of the pylorus, may be performed. I believe in many instances this two-stage operation will be followed by better results than if too much is attempted at one sitting.

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Foreign Bodies Left in the Tissues.

The belated discovery in the abdomen of a forceps or swab is liable to result in an action for damages, at the trial of which the position of the operator, who has to admit that the counting had been omitted, is far from enviable. Routine checking might with advantage be extended to all the smaller articles, such as needles.

The peritoneum is not the only hiding place for forceps and swabs. A pressure forceps has been removed from the axilla some weeks after a breast operation.

The possibility of such an occurrence can only be prevented by counting the instruments and swabs in every operation in which the wound is capable of harbouring them.—C. H. Whiteford in *The Medical Press.*

ORGANIC STRICTURE OF THE URETHRA.*

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An organic stricture is defined as a permanent obstruction of the urethral canal due to plastic changes in its wall. It is interesting to note that although not in the true sense of the word organic strictures, there are obstructions of the congenital variety that may produce many of the symptoms and sequelae which follow on true organic fibrosis. The congenitally narrow meatus and bands posterior to the fossa navicularis are well known cases in point. The semilunar valve-like structures, which occasionally occur at the junction of the membranous and bulbous urethras, which Posner believes are embryonic remnants of the so-called cloacal membrane, may act as obstructions but are usually discovered only when it becomes necessary to pass a catheter or instrument.

That urethritis and especially urethritis due to Neisserian infection, is the cause in at least 90 per cent. of the cases of stricture there can be no doubt; in the remaining 10 per cent. trauma of one kind or another is the etiological factor. Rupture of the urethra, which, when present, is usually found in the membrane portion, is due to an impingement of the urethra against the sharp triangular ligament during a fall astride some obstacle. Some years ago I met two cases of very firm fibrous stricture of the penile urethra caused by the patient manually breaking the urethra to relieve an unusually severe chordee. This method of curing chordee has fortunately gone out of vogue.

Masturbation as the trauma which may produce minute abrasions of the urethral mucous membrane, which are the forerunner of stricture, should be borne in mind. Several cases of this type have come under our notice.

F. D., age 25, referred by Dr. H. J. Friedman, had complained for 5 years of diminished size of his stream and frequent urination, being obliged to void every hour, day and night. From the age of 14 to 20 he had been a very vigorous and frequent masturbator, and on one or two occasions had noticed, after a specially vicious session, a drop of blood appear at the meatus. He had no venereal history—had never had any discharge—in fact his symptoms began shortly after stopping the habit and before he had attempted sexual intercourse. He had been for three years under the care of many medical men, and among them reputable urologists who treated him mainly for congestion of the prostate and vesicles. His urine at the time of examination was macroscopically and microscopically normal. Examination revealed the presence of three sharp linear, very resistant strictures at the penoscrotal junction of 23 F. caliber.

On April 1, 1916, the strictures were cut to 32 F. by the Otis urethrotome under local (alypin) anesthesia. For two weeks the symptoms remained the same and then disappeared completely, so that at the present, although his treatment has consisted only in the occasional passage of a full sized sound, he urinates with a free stream, four times a day and not at night, and has gained many pounds in weight.

Again trauma caused by caustic materials inserted or injected into the urethra is occasionally a cause of rather obstinate strictured areas. I have seen many of this type. A strong injection of mercuric bichlorid which the fearful young man frequently used after coitus as a prophylactic produced so much inflammatory reaction, sometimes accompanied by hemorrhage, that temporary retention was quite common. In such cases secondary ulceration follows with resultant later fibrosis. In one case under my observation a 50 per cent. solution of protargol which was dispensed by a druggist's assistant in mistake for a one-half per cent. solution, produced the same intense swelling, retention and later an obstinate stricture.

Pathology—In traumatic stricture caused by rupture of the urethra, the extent of the development of fibrous tissue depends on the distance between the severed ends of the canal and upon the subsequent destruction of tissue by necrosis or sloughing from infiltration of septic urine. The amount varies from a thin fibrous band, involving only the mucous membrane, to large masses of thick tough tissue involving the mucous, submucous and periurethral areas, or even the perineum and skin.

In the gonorrheal variety there are certain locations where strictures are most common and the anatomy of the urethra would seem to offer a reason for this. The normal dilatations found in the bulb and the fossa navicularis provides small recesses in which deposits of the gonorrheal discharge may lodge between urinations, thus producing more irritation and inflammation in these localities. In the same way the bend of the penis over the suspensory ligament at the penoscrotal angle produces more or less retention of discharge at this point. The extreme frequency of stricture of the bulb, estimated as high as 70 per cent. of all strictures, is believed by Watson, not only to be due to the presence of normal dilatation at this point but also to the fact that the floor of the bulbous urethra just in front of the membranous opening is the point of the fixed curve on which the full force of the stream impinges when the bladder is empty, and in gonorrheal urethritis damage is done by this force.

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The work of Wassermann, Finger and Guyon on the minute anatomy of chronic urethral inflammations demonstrated that the pathological changes are found primarily in the glandular and periglandular tissues and that the subepithelial tissues are invaded through these. Reginald Harrison, on the other hand, maintained that the starting point of fibrosis is an erosion which allows minute extravasation of urine and septic products into the deeper tissues and that this extravasation is the cause of the irritation which produces the round-celled infiltration.

It would seem reasonable that both of these theories are correct; that the beginning of the endothelial inflammation and infiltration takes place through the glandular tissues. Just so soon as there is a subepithelial infiltration which must necessarily produce more or less obstruction to the urethral lumen, the impingement of the urine against the obstruction causes a dilatation, however slight, immediately behind the obstruction, allowing thereby the retention of a small quantity of septic urine and discharge. These retained products set up added irritation which, together with the force of the stream, bring about an erosion and consequently minute extravasations are permitted into the deeper tissues, thereby increasing the infiltration by small round cells. In the course of weeks or sometimes months, metamorphosis takes place in which the round cells are replaced by connective tissue. Finally, as in scar tissue formation in any part of the body, the round cells disappear, the elastic fibers are destroyed, the bloodvessels pass into a condition of chronic arteritis, the epithelial cells over the lesion proliferate, degenerate and become flattened and stratified so that a dense avascular inelastic fibrous stricture develops.

There are many interesting observations in reference to this common complaint that must have attracted the attention of those who make urology a specialty. Why is it that all cases of gonorrhea, especially those that go on to the chronic stage, do not develop stricture, while in others of comparatively recent origin, infiltrations and fibrosis occur with unfortunate frequency? That individual idiosyncrasy has somewhat to do with this, just as we find in those who develop keloid in cutaneous scars, there can be no doubt. Also, it would seem that the gonococcus itself varies in virulence in different cases or at least that gonococci of the same virulence produces a more violent reaction on some mucous membranes than others. At any rate, cases do differ in severity and it is reasonable to believe that in severe acute attacks with marked chordee, excessive inflammation and hemorrhagic discharge, erosions and ulcerations occur which pave the way for future infiltration. Neglect on the part of the patient, together with alcoholic or sexual indulgence or improper treatment by strong injections or irrigations, prolong the inflammation of the urethra, in localized areas, with resultant stricture formation and this obstruction in turn keeps up the very condition the physician is trying to cure, viz., chronic urethritis.

It is a matter of interesting observation, too, that the bad type of stricture which was comparatively common some years ago, does not today occur so frequently. I believe there are a number of reasons for this. Both the profession and the laity are learning more and more that gonorrhea is a serious malady, followed at times by dire consequences if uncured and therefore the physician is more exacting in urging a continuance of treatment until a cure is effected, and the patient is more willing to persist in treatment until discharged as cured. Not only this but also since the pathology of conditions which bring about chronicity are better understood by the profession at large, soft infiltrations are detected earlier, and treated while they may be easily brought under control and before they reach the severer stages. Again, the discontinuance of strong, irritant and caustic injections which formally were so favored as abortants and the use in their place of mild unirritating organic silver salts, has tended to lessen the stricture evil.

Diagnosis—The diagnosis of stricture may be accomplished by (1) sounds, (2) bougies à boule and (3) the urethroscope. A metal sound is reliable only in detecting the presence of a tight fibrous stricture. The tapering point of the sound which enters a stricture and dilates it as it passes makes those of larger caliber and those of the soft variety difficult thus to detect. The metal bulbous bougie is fairly satisfactory for stricture of the penile urethra, but since it is inadvisable to bend these explorers for insertion into the posterior urethra, one is liable to mistake a stricture of the urethra just in front of the bulbo-membranous junction for the bulbo-membranous junction itself. The same holds true regarding the urethroscope, which also cannot ordinarily be utilized in strictures under 20 French owing to the caliber of the endoscopic tubes.

The instrument of choice is the flexible bougie à boule. Where stricture is suspected a bougie, well lubricated and as large as the meatus will permit, is gently inserted into the urethra, passing through the spongy, membranous and prostatic portions, directly into the bladder. If this size cannot be passed, successively smaller sizes are tried until one is found which will enter the bladder. On its withdrawal the shoulder of the examining bulb is obstructed in the normal urethra at the (1) internal meatus (the vesical sphincter), again at the (2) posterior layer of the triangular ligament (the membrano-prostatic junction) and again at the (3) anterior layer of the triangular ligament (the bulbo-membranous junction). That is, in a normal urethra we meet with three normal catches from the bladder to the meatus. If more than three catches are found from the bladder anteriorly, a diagnosis of stricture can be made. The slight grasping of the bulbous bougie by the vesical sphincter and the cut off muscle, give to the experienced hand an entirely different sensation from that of the hard, sharp and rough catch of the fibrous stricture. It is easy, too, for the experienced to differentiate the recent soft infiltration from the organic obstruction, with the flexible bougie à boule we can determine the number, location, caliber, character—whether hard or soft—in fact all that one needs to know as far as diagnosis is concerned.

Treatment—The methods of treatment in use are (1) dilatation, (2) some form of cutting operation. Decision as to the method of procedure in each individual case demands a nicety of surgical judgment which is the keynote to success. To cut an uncomplicated stricture which is dilatable, with the consequent scar tissue formation at the site of the incision in the urethra is extremely poor surgery. Broadly speaking, then, operation is indicated only where dilatation is impossible or in cases of resilient strictures which contract again and again in spite of dilatation or where sepsis or badly infected urine make operation imperative.

The degree of fibrosis rather than the caliber, is our guide to operation for some exceedingly small strictures dilate easily and remain dilated while others of larger caliber recontract speedily. Dilatation is without question the method of choice. Young reports a series of two hundred and ninety-five cases treated by this method without any mortality and a cure in 70 per cent.

It is found clinically that gonorrheal strictures of both the bulbo-membranous region and the penile urethra are more amenable to dilatation than are the dense scar formations due to trauma. In fact the majority of gonorrheal fibroses are dilatable.

Dilatation is performed by (1) filiforms, (2) silk woven flexible bougies, (3) metal sounds, (4) expanding dilators. The result desired in any sort of dilatation is attained not so much by the mechanical stretching as the production of a temporary anemia followed by a hyperemia which carries off the products of inflammation. Since there is always a desirable congestion of greater or less degree following instrumentation as is frequently seen in tight strictures in which the size of the stream is narrowed for a day or two after dilatation, after which the stream is larger than before treatment, it is unwise to dilate too frequently. Generally speaking, depending of course on the amount of reaction produced and on the irritability of the stricture, dilatation should be attempted from 3 to 10 days apart. There are three essentials to the successful passage of an instrument in cases of urethral stricture—the instrument must be aseptic, well lubricated and used with a gentle hand. It is the lack of the third essential—the delicate touch—that accounts for most of the accidents which occur in instrumentation in this locality.

The sort of instrument to be used, whether soft or metal, depends upon the caliber of the obstruction. In those of caliber below 16 F. due to the liability of severe injury to the mucous membrane or to the production of a false passage by the sharp point of a metal instrument below this size, flexible instruments only should be utilized. Exceptions to this rule exist in those cases where a filiform has been introduced and further dilatation is desired by means of metal Gouley tunnelled sounds which are threaded over the filiform, thus overcoming the possibility of the production of a false passage, and also where acquired skill in instrumentation and gentleness of manipulation, make it possible for the surgeon to use the rigid sound of small caliber to great advantage.

In strictures above 16 F. the pliable bougies are stiff and unwieldy and much better results are obtained by sounds or dilators. The rule I observe is to use sounds until the stricture has been dilated to the size of the meatus and thereafter, if further dilatation is necessary, to utilize the advantages of the expanding dilators until the obstruction has been overcome. The dilator of choice is Kollmann's, which is four bladed, and by which dilatation can be accomplished within the meatus up to 45 F. An added advantage possessed by this dilator is that in recent models there is a universal handle to which may be attached different blades suited to the location of the obstruction, one for the anterior urethra, another for the deep urethra and a third for both anterior and posterior. This makes possible the dilatation of the affected area alone, leaving the unobstructed mucous membrane undilated.

In days gone by, urethral chill and fever were comparatively common after urethral instrumentation but since the practice which should never be omitted, of irrigating the canal preferably by the Janet method, with a mild antiseptic after passing instruments, septic disturbances are practically unknown. Weak solutions of silver nitrate (1-8000) are eminently suited to this purpose. The irrigating sounds presented before the American Urological Association in 1909 by Victor C. Pedersen, admirably admit of the dilatation of the stricture and irrigation of the bladder through the instrument, to be followed by filling the bladder with the antiseptic fluid which the patient voids after removal of the sound.

Operation—While the majority of strictures can be cured or relieved by dilatation, in a certain number of cases a cutting operation becomes necessary. (1) Those which occur near the meatus, including the congenitally small meatus, (2) the resilient strictures which habitually recontract to their former caliber after dilatation, (3) the traumatic variety which usually are hard and dense, requiring force to pass through them, (4) those cases where septic infection of the bladder or kidneys demand removal of the offending sepsis, (5) and those complicated by extravasation of urine, need operative measures for their relief.

The operation to be chosen depends upon the (1) location, (2) the permeability of the lesion.

Internal Urethrotomy—In all strictures anterior to the bulb internal urethrotomy is advisable. Those within the first inch are best taken care of visually by means of a scalpel or specially shaped knife through an urethral speculum. Those occurring between the first inch and the bulb are cut by a urethrotome, of which there are two types: (1) those which incise the stricture from before backward—Maisonneuve type, (2) those which expand and cut from behind forward—Otis type. In small calibered contractions, under 20, the Otis instrument cannot be inserted owing to its size, but in the larger strictures, if one is careful to accurately locate the position of the stricture by means of a bulbous bougie and then by measurement to insert the urethrotome just behind the contraction and cut only the strictured area, it is an instrument of undoubted service. In tight strictures the Maisonneuve or urethrotome or one of its modifications is indispensable. H. McClure Young has devised a clever instrument in which he has utilized the advantages of the small calibered grooved staff of Maisonneuve to which he has added an extra tip by which the instrument may be threaded over a filiform and also the use of the hinged knife of Albarran controlled from the handle of the instrument and protected during introduction by a tapering olive after the idea of Kollmann. Urethrotomes are not suitable for deep strictures, *i. e.,* those of the bulbous or bulbo-membranous portion unless at the same time an external urethrotomy be done, on account of the danger of hemorrhage or sepsis. Indeed, safety demands that internal operation be confined to anterior strictures alone. Where both penile and deep strictures are present the external and internal urethrotomy should be combined.

External Urethrotomy—I. With a Guide. When a fibrosis occurs in the bulbous or bulbo-membranous portions of the urethra which is not dilatable, the method of procedure depends on whether or not a guide can be introduced through the stricture to the bladder. The relative simplicity of an operation with a guide, over the, at times, extreme difficulty of operation without a guide makes it imperative that any amount of time, labor and patience should be expended in attempting to pass a filiform before the operating room table is reached. It is only in very exceptional cases that this cannot be accomplished. In no case where the patient is able to urinate, even the smaller stream, should be subjected to the danger of a long anaesthesia on a kidney which usually is damaged, while the operator patiently searches over an indefinite period for the opening in the strictured urethra, in which there is no guide. Preoperative patience is much more commendable than operative patience in such cases. When it is remembered that congestion and spasm have much to do with the obstruction, the discontinuance of instrumentation if unsuccessful on the first instrumentation and paying attention to relief of these conditions by hot Sitz baths, diluents and antispasmodics, will probably bring success on the next or following day. In a limited number of cases, too, the urethroscope may be brought into play to assist in finding the opening in the strictured urethra. II: Without a Guide. When, however, careful attempts to pass a filiform have met with failure or where retention or sepsis make an emergency urethrotomy necessary, there are a number of operations in use. (a) Coc's operation was originally intended for cases of acute retention in impassable stricture. Its success depends upon the presence of distention of the bladder and urethra behind the stricture. The left forefinger is inserted into the rectum to the apex of the prostate and with this as a guide a stab wound is made one-half inch in front of the anus and pushed straight for a point in the dilated urethra anterior to the finger.

(b) Suprapubic cystotomy is performed and retrograde insertion of the metal sound the point of which is cut down upon in the perinium. Fuller has reported good results in cases with bad infiltration where masses of dense cartilaginous-like tissue surrounded the bulbo-membranous urethra, with or without sinuses, where he performed a primary suprapubic cystotomy and then some time later when the dense tissues had softened as they do soften, when the course of urine has been deviated, he did an external urethrotomy by the perineal route.

(c) Were it not for the length of time necessary to complete such an operation and the liability of secondary infection of the cut surfaces, excision of the strictured urethra and suturing of the healthy cut ends as advocated by Molliere, Koenig and Marion should produce good results. Urethrectomy is not advisable, however, when the fibrosis extends over 25 mm. in length and when attempted. The bladder should be kept empty after operation by syphon drainage through a suprapubic wound.

(d) Perhaps the most frequently used operation and one that is generally attended with success consists in the insertion of a sound or staff down to the stricture and the opening of the urethra on the guide, the edges of the urethra are retracted by clamps or sutures and the distal urethra searched for under a strong light by probe or filiform. After entering the bladder, a tunneled grooved director is passed over or alongside and the scar tissue divided on this. At times cases are encountered in which it is exceedingly difficult to find the urethra or if found to insert a guide. The suggestion of Crile to inject prior to operation, a solution of methylene blue to color the canal is of practical value to be used in conjunction with this operation. He dissolves one gram of methylene blue in 200 cc. of water and with a urethral syringe he distends the urethra gently at first and then with considerable force. After five minutes the urethra is washed out with sterile water. Upon incision of the urethra and retraction of its edges the blue course of the urethra is entered by a grooved director and the scar tissue incised or the blue urethra is followed and cut by scissors.

(e) The operation advocated by Hugh H Young which is very commendable, especially for those who, like him, are experts in perineal anatomy, aims at entering the stricture from behind, using the skin incision as in perineal prostatectomy, the apex of the prostate is exposed by carefully dividing the central tendon and recto-urethralis muscle. A median incision is then made into the membranous and anterior portions of the prostatic urethra, a sound is passed forward and communication established between the anterior and posterior urethras. After removal of the cicatricial tissues on the floor, the posterior and membranous urethras are closed by fine catgut over a large retained catheter which emerges from the wound in the bulb.

In concluding let me remark that there is no operation which offers more brilliant immediate results than that of external urethrotomy. When sounds are passed regularly at intervals of one week, then semi-monthly, then monthly and finally semi-annually, the results remain good in the majority of instances. Failure in this post operative detail very frequently means recontraction and the return of the obstruction to its former pitiable condition.

Conclusions.

1. Urethritis is the cause of organic stricture in 90 per cent. of the cases. The careful treatment of this disease from its inception, especially avoiding the use of strong, irritating injections or irrigations, tends to lessen stricture formation.

II. The early recognition of inflammatory infiltrations and the treatment of these before fibrosis takes place, prevents the bad forms of organic stricture so common in the past.

III. The flexible bougie à boule is the most suitable instrument for detection of the number, location, calibre and character of strictures.

IV. Gradual dilatation is a method of choice in the treatment of stricture in the vast proportion of cases.

V. When a stricture is undilatable or when sepsis retention of urine or extravasation, make operation obligatory, no amount of time, labor and patience should be spared to accomplish a passage of the guide prior to operation, thereby preventing the injury produced by long anaesthesia on the kidney which is frequently already damaged.

VI. When a filiform cannot be introduced, the use of methylene blue solution is of marked service as an aid in finding the opening in the strictured urethra.

VII. Post-operative dilatations are necessary over a long period of time to prevent recontraction.

131 East 17th Street

STRICTURE OF THE URETHRA FROM EXTRA-URETHRAL CAUSES.*

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The scope of this topic suggests a great variety of important urological conditions, also several definite pathological entities of which the symptom of partial or complete obstruction to the outflow of fluids through the urethra is but a minor sign. In consequence, I shall not attempt to present in detail all the various causes, but shall mention a few of the more important ones, illustrated by suitable case reports collected from my records or from those that have come under my observation.

The lumen of the urethral canal may be contracted at any one or more points throughout its entire length. Among the principal causes of pressure from without may be mentioned spasms of the muscles in and about the urethra; extravasation of blood or urine from injury or other causes; purulent collections and infiltrations; neoplastic formations; fracture of the pelvic bones; and growths situated within the capsule of the prostate gland.

Spasm of the compressor urethrae muscle may be caused by acute or chronic disease of the prostatic urethra; by reflex irritation from more or less remote pathological lesions; by organic disease of the central nervous system; and by emotional excitement. The difficulty in such cases is usually intermittent in character: at one time the flow of urine is free and the stream good; at another time there is difficulty and even retention. A large size blunt sound will encounter obstruction at about six inches from the meatus, but gentle continuous pressure succeeds in overcoming this resistance; or an anesthetic may be given and the sound will then pass readily into the bladder. In spasm from organic disease of the central nervous system, the spasm may be permanent, resulting in complete retention or atony of the bladder with dribbling from over-distention.

Traumatic stricture is usually located at the triangular ligament. It is at this point that the urethra is most likely to be injured. A fall astride a hard object or a blow on the perineum is the usual cause. The bulbo-membranous urethra is caught between the impinging body and the sharp lower border of the subpubic ligament. A slight degree of force may therefore produce serious injury. When the urethra is cut entirely across, or partially so in the upper walls,—as usually occurs,—or when it is severely bruised, the loss of tissue is replaced by a fibrous formation in the corpus spongiosum. No matter what may be the location of traumatic stricture, it is composed of scar tissue, the extent of which depends upon the degree of destruction of the urethral walls, the distance between the ruptured ends, and the subsequent destruction of tissue by necrosis from the injury or sloughing from septic complications. In the more severe conditions it is disproportionately dense on account of the lack of rest incidental to urination and sexual excitement. Obviously, such a stricture is the worst with which we have to deal. It is rarely amenable to dilatation and usually requires a perineal section. Subsequent operations and neglected after-treatment sometimes add to the difficulty, as the following cases from my records will illustrate:

C. R., referred to me by Dr. Gordon K. Dickinson of Jersey City, November 5, 1913. His age was twenty years, but his continuous ill health for fourteen years had so dwarfed his body and mind that he appeared to be little more than twelve. His parents died of nephritis when he was three years of age, and he was left in care of a brother and sister little older than himself. When five years of age he fell from a chair astride the wheel of a baby carriage, and he was brought to St. Mary's Hospital, Hoboken, N. J., with contusions around the perineum and unable to urinate. Though a thorough perineal section was performed, he lapsed into ill health and suffered continuous bladder trouble after the operation. One year later an abscess, probably perinephric, was opened in the right lumbar region. A second perineal operation was performed when he was twelve years of age, and still another when he was fifteen years old. Retention of urine, with its usual symptoms, was said to be the indication for operation each time. My examination showed a condition of chronic infiltrative peri-urethritis limited to the scrotum and perineum, both of which were swollen and indurated. Through numerous fistulous openings the urine was voided, and from them and the urethra pus exuded. The urine collected in the squatting position was turbid, and the odor was foul. An impassable stricture was found at the bulbo-membranous juncture. He was admitted to the service of Dr. James Pedersen at the Post-Graduate Hospital. Two days later we performed a preliminary suprapubic cystotomy for drainage, and freely opened up and curetted the various fistulae and pus pockets. Two weeks thereafter, under anesthesia, we were able to pass a small staff through the urethra, and combined external and internal urethrotomy was done. Sounds up to 26 F. were passed at five-day intervals. The suprapubic wound closed in about four weeks, but drainage was maintained through the perineal wound for six weeks. During this time the renal function improved, the patient became brighter, the cystitis lessened, the urine became fairly clear, the fistulae closed, and the indurated mass softened and absorbed so that the testes could be palpated. The patient soon became able to hold his urine for several hours and voided it through the urethra. I see him now once a month and pass a 25 F. sound. It is certain that the considerable deposit of cicatricial tissues in the perineum, the natural and unavoidable consequence of a severe traumatism and four cutting operations, will recontract unless the precaution of passing a sound is taken.

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* Read before the New York Society of the American Urological Association, at the New York Academy of Medicine, October 4, 1916.

Traumatic stricture may also occur in the anterior urethra. Injuries that were trivial at the time, not causing any immediate hemorrhage or retention, perhaps long forgotten in the adult or never remembered in the child, are not infrequently the cause of stricture later on. My former chief and associate, the late Dr. L. Bolton Bangs, in a paper entitled "A Plea for External Urethrotomy in Minor Traumatisms of the Urethra," called attention to the necessity for a perineal urethrotomy as soon after the injury as possible, and abstention from passing sounds and catheters. By perineal drainage nearly absolute rest is assured to the muscles of the perineum, the function of the urethra in most of its length is abrogated, inflammatory complications are prevented by irrigations, and physiological rest for the whole region is almost as nearly obtained as is the case when a splint is applied to a broken leg. The passing of sounds and catheters through a lacerated urethra interferes with the normal processes of repair, irritates the locality of the lesion, and induces an amount of cicatricial deposit which subsequently becomes a source of misery, and often of danger to the life of the patient. A minor accident that has apparently produced little or no injury is liable to produce stricture later on. In the deep urethra, traumatic stricture has been caused by fracture of the pelvic bones and by gunshot and stab wounds.

Urination may be difficult or impossible from obstruction of the urethral channel by enlargement or inflammatory disease of the prostate, by new growths situated within the capsule of the gland, and by contraction of the prostatic capsule and consequent stenosis of the urethra with elevation of its floor above the base of the bladder, before and after the operation of prostatectomy.

These conditions give rise to symptoms of gradually increasing obstruction, and those of the bladder predominate. The obstruction to the passage of instruments is at the apex of the prostate, and rectal examination aids in making a diagnosis.

Localized scleroses or peri-urethral plaques may cause urinary obstruction; and cicatrices from chancre and chancroid occurring at the meatus or within the urethra, inevitably produe stricture. A narrow meatus or neglected treatment after meatotomy may cause far-reaching symptoms of obstruction, as I noted in a patient in my clinic a short time ago.

He was forty years of age and unmarried. From the history obtained, I gathered no facts of previous illness relevant to the condition found. He denied venereal infection. He was suffering from frequency, urgency, dysuria, a weak dribbling stream, bladder atony, incontinence, and even embarrassed renal activity. A meatotomy had been performed two years before and he had neglected subsequent treatment. An examination showed the opening of the narrowed lumen to be about the size of a filiform bougie. It was enlarged, and a 28 F. sound was easily passed into the bladder.

Peri-urethral inflammation takes various forms, such as abscess, fibrous masses, gangrenous inflammation, or extravasation of urine. Excepting in traumatic cases, extravasation of urine is probably always preceded by peri-urethral inflammation. The urethra may or may not be the seat of stricture, but it is usually the source of infection. The inflammation spreads to the peri-urethral tissues by the blood or lymph vessels, or more probably along the ducts of the urethral glands. Abscesses may develop and by pressure cause varying degrees of stricture in any of the anatomic portions of the urethra. They occur most frequently in the penile portion. If they open externally, a urinary fistula usually follows. In consequence, an attempt should be made to open abscesses in the penile portion through the urethra, which may be done with the aid of a wire speculum and reflected light. A fine eye knife may then be passed carefully along the urethra and plunged into the abscess, which is held between the finger and thumb of the left hand.

Abscesses of the bulbous portion may develop in relation to the perineum and scrotum. I quote from the record of one such case.

My patient, now fifty-three years of age, acquired gonorrheal urethritis when twenty years old. A stricture followed, and he was treated with electricity for many years. About eight years ago a perineal abscess formed, ruptured externally, and a fistula resulted. Two years later the strictured area was resected and the fistula closed. While the urethra was patent, he gave little heed to after-treatment, although cautioned of its necessity. He has had many experiences, yet periodically for months he has neglected the advice offered, and in consequence the urethral stricture recontracted and perineal abscesses developed many times, and symptoms of increased obstruction ensued. He reported at the office whenever he was able to, and several times an abscess was opened—fortunately for him—before it had greatly increased in size and passed forward under cover of the scrotum. A fistula was the usual result, the urine passing through the perineal wound until the strictured urethra was again sufficiently dilated.

In such cases sinuses may gradually develop and later form fistulae. The urethra immediately behind the stricture becomes dilated and thinned; and eventually ulceration occurs at some point, usually upon the floor; then, as a consequence of retention of urine or straining efforts at micturition, a few drops of urine escape into the surrounding cellular tissue and an extension of the ulcerative process begins, with more or less sloughing of the area involved. The slower the process of infiltration the more apt it is to be confined by inflammatory exudate, and masses of fibrous tissue form which may prevent serious infiltration. Small abscesses and calculi sometimes develop and numerous fistulae usually result. If the urine escapes into the cellular tissue rapidly and in considerable quantity, the scrotum, perineum, groin, abdomen, and thighs may be involved in a diffuse swelling and infiltration. In such cases the treatment should be prompt and energetic. Perineal section should at once be performed and free incisions made over each prominent point of inflammation.

Peri-urethral abscess in relation to the membranous urethra usually affects one or both of Cowper's glands, and is recognized by the filling-up of the sulcus at the side of the membranous urethra, detected on rectal examination.

Extravasation of urine with a virulent and rapidly spreading cellulitis and sloughing of the urethra is probably due more to some virulent anaerobic bacterium than to the extravasated urine. Cases have been reported in which no stricture existed.

A case was brought to my service while on duty at the U. S. Naval Hospital, Brooklyn. The patient was a man about forty years of age, and he had served several enlistments. A history of gonorrheal infection was obtained; in fact, he had had several attacks many years before. For a few years prior to the operation I am reporting, he had noticed that the urinary stream was small, thin, and twisted; the projection was feeble, and he had to strain to pass urine; and the stream was poor throughout and finished in a feeble dribble. He voided frequently and at times involuntarily. After a night of excessive alcohol and venery, he was unable to micturate, due probably to swelling of the mucous membrane and the increased volume of urine. He noticed pain in the posterior renal regions, but more particularly he complained of the severe suprapubic pain which occurred in paroxysms with intervals of aching. After a rigor and rise of temperature, a profound toxemia developed, and he was brought to the hospital a few hours later in profound collapse. He had passed no urine for several hours, and a dull-red brawny induration had appeared in the perineum and scrotum and was spreading up over the abdomen. Crepitation from the formation of gas was noted. An attempt to pass a staff or guide was unsuccessful, and perineal cystotomy without a guide failed, owing, in part, to the inflammation and urine extravasation and the difficulty in recognizing the various structures.

Suprapubic cystotomy was then performed, and by retrograde catheterization with a metal instrument the perineal section was completed. Multiple incisions were made in the skin of the scrotum, perineum, and abdominal wall wherever infection had spread. With through and through irrigation of the bladder, and free drainage and frequent irrigations of the infected cellular tissue, we finally succeeded in overcoming this rather severe infection. Later, we did a secondary operation, dividing the stricture at the bulbo-membranous juncture, diverting the urine, and allowing the perineal wound to close.

The primamry malignant new growths of the penis (sarcoma and epithelioma) may cause stricture. The former is very rare; the latter forms about three per cent., of all malignant growths. Epithelioma frequently develops where phimosis is present, and usually commences on the foreskin, glans, or in the urethra. It begins as a wart or ulcer, and in the majority of cases forms a cauliflower-like growth. The lymphatics are involved comparatively early. Narrowing of the urethra may be observed, but the corpus spongiosum is usually spared and urination is unimpeded. If the canal becomes obstructed, the urine usually finds its way through one or more of the fistulous openings, and retention of urine is very rare. Sarcoma of the penis usually appears as a tumor in one of the erectile bodies. The growth is round-celled, spindle-celled, or mixed-celled, and melanotic sarcoma has been observed. The lymphatics are early involved, and it develops and spreads with characteristic rapidity. It frequently causes priapism by occluding the cavernous spaces, and may also occlude the urethra and obstruct urination. Partial or total amputation of the penis, with removal of the inguinal glands, is the only treatment. In sarcoma, the prognosis is absolutely bad. In epithelioma, recurrences in twelve to twenty per cent. of cases are recorded.

In all forms of stricture, regardless of the cause, secondary changes occur. Dilatation of the urethra on the proximal side, with chronic inflammation, and sometimes ulceration, takes place. The muscular walls of the bladder hypertrophy at first, to overcome the obstruction, and later become flaccid, and residual urine accumulates. Cystitis usually develops, and calculi may form. From the damming back of urine on the kidneys, the ureters may become dilated, the pelvis of the kidney distended, and infection of the parenchyma may take place. In the treatment of such cases, sound surgical judgment and experience are essential. Even the passage of a catheter and withdrawal of a large amount of residual urine may cause an acute congestion of the bladder and kidneys, with suppression of urine. The incidence of stricture from causes within is far greater than from causes without the urethra, but the secondary changes in the genito-urinary tract are much the same. In consequence, the importance of recognizing and treating strictures of any caliber and from any cause seems apparent.

40 East 41st Street.

THERAPEUTIC UNCERTAINTIES CONCERNING NEISSERIAN URETHORRHEA.

A SEMI-CRITICAL COMMENTARY.

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Louisville.

In previous commentaries I directed attention to prevailing uncertainties of understanding, also absurdities and ambiguities of current expression, concerning one of the most common disorders, viz., Neisserian urethrorrhea—the so-called gonorrhea, blennorrhea, blennorrhagia and urethritis—and presented *seriatim* academic evidence in substantiation of the criticisms offered.

The unreliability of prevailing methods of therapeusis, and the unsatisfactory state of existing knowledge, concerning any type of pathology, may be recognized by the multiplicity of methods and remedial agents recommended for its alleviation or cure, and Neisserian urethrorrhea is not entitled to unqualified exception to the rule. Nearly all the drugs mentioned in the pharmacopeia, the scores of others unrecognized as legitimate by scientific therapeutists, have at some time been recommended or employed in the treatment of this disorder, alone or in combination—"internally, externally and eternally"—and their mere enumeration would require more space than this entire address.

When the immortal Neisser isolated the micro-organism which unfortunately was erroneously named the gonococcus ("semen berry"), and which was later demonstrated as the essential etiologic factor of the disorder under consideration, it was confidently anticipated that the treatment, which had hitherto necessarily been purely empirical, would be promptly placed upon a strictly scientific and definitely understandable basis. That such expectation remains unrealized, and that there is yet no consensus of opinion nor unanimity of therapeutic procedure, constitute the principal *raison d'etre* for commentaries of this character.

One of the simplest axioms in rational therapeusis is "when the cause of the disease is known and can be definitely located, its elimination should be accomplished by the most available means." And, paradoxical as it may appear, whereas in local invasion of the diplococcus of Neisser the essential etiological factor is definitely known; whereas its local presence is easy of determination by the employment of modern methods of investigation; whereas the resulting pathology is regarded by the majority of observers as distinctly remediable, the fact remains that no single method of therapeusis yet devised seems capable of certainly effecting an absolute cure, regardless of the period in the history of the disorder when such remediable measure may be applied.

The admonition contained in the majority of text-books and elsewhere, that treatment should be deferred until subsidence of the initial manifestations—inflammation and suppuration—is deserving of especial comment, since reasoning from analogy and judged from the standpoint of commen sense such advice represents the acme of therapeutic absurdity. In no other actively contagious disorder afflicting the human being is a similar plan recommended or followed; in fact, the converse is true in the majority of contagious diseases, the most appropriate methods of therapeusis being inaugurated and vigorously applied so soon as the initial symptoms appear, in the hope of accomplishing complete elimination of the *fons et origo mali* prior to the supervention of dangerous complications and resulting sequelæ. In the disease under consideration there can be no reasonable doubt that delay in the institution of adequate treatment has in many instances been responsible for untoward ultimate results, the diplococci in the interim having penetrated tissues from which their future dislodgment and destruction must be considered difficult and uncertain by any known method of treatment.*

It is not unknown that many practitioners to whom venereal patients apply for treatment, likewise the majority of druggists who dispense to human ills in both urban and suburban communities, and also certain manufacturers of pharmaceutical specialties (always under the supervision of so-called laboratory experts), have their favorite combinations for both internal and external indiscriminate administration. It has also been demonstrated that many of these ready-made combinations may oftentimes be productive of harmful rather than beneficial effects, the reasons for which are too obvious to require specification. The so-called "prescribing" druggist who dispenses decoctions for both internal and external exhibition, in the absence of pathologic data and therapeutic indications which clinical and anamnestic investigation afford, is a most pernicious factor in the management of venereal and other diseases. Of course it is unfortunate that, either through ignorance or in the hope of preserving secrecy, the average venereal patient first applies to the corner druggist for advice and treatment; and failing to secure relief from self-administered ready-made remedies there obtained, the family medical adviser is next consulted. It is equally unfortunate that the treatment administered by the average medical practitioner is generally followed by indifferent success, because of (a) his imperfect understanding of the pathology of venereal disease, (b) his inattention to important minor details of investigation and inquiry, and (c) his inadequate therapeutic equipment. In many instances not until the expiration of weeks or months after the original invasion, and usually after the supervention of more or less serious complications, does the patient consult the specialist upon whom is then imposed the difficult task of ultimate cure, which is usually possible of accomplishment within a reasonable time (exact period uncertain) provided the active cooperation of the patient can be assured.

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* The education of the writer must have been sadly neglected, or his faculty of understanding must be woefully deficient, as he is unable to appreciate the reason for postponing the treatment of syphilis "until the appearance of secondary manifestations," and deferring the treatment of Neisserian urethrorrhea "until the initial symptoms have subsided." It has always appeared to him that such advice was a confession of either pathologic ignorance or diagnostic inability on the part of the medical attendant. Certainly in the light of present understanding it would seem almost a criminal offense to subject the patient in either case to the additional dangers which delay in treatment entails.

While it is well understood that the primary effect of Neisserian infection is essentially local, it may secondarily become general (exact period undetermined) by systemic invasion of the diplococci, and practically every organ and structure embraced within the human economy may be thus implicated. Competent observers claim to have isolated the organism from every tissue of the body except "the intestine, the liver and the spleen." Insomuch as dissemination occurs from the local focus through both the vascular and the lymphatic channels, as demonstrated by recovery of the organism from the blood stream* and also infiltrated lymphatic glands, it is difficult of understanding how the hepatic, splenic and intestinal tissues can remain free from invasion, nor is the apparent exemption to be explained upon any hypothesis thus far suggested. And since it is known that practically all the glandular, muscular and osseous tissues are invaded, the conclusion seems warranted that failure to recover the organism from the liver, the spleen and the intestine must be due to some imperfection in laboratory technic. The literature contains record of numerous instances in which arthritis, osteoarthritis, osteitis, periostitis, osteomyelitis, tenosynovitis, bursitis, etc., owed their origin to invasion by Neisser's organism; and the same is equally true of adenitis, myo-, endo- and pericarditis, meningitis, encephalitis, pleuritis, peritonitis, salpingo-öophoritis, metritis, endometritis, cervicitis, stomatitis, cystitis, pyelitis, nephritis, ureteritis, proctitis, etc.

General considerations: Only a few of the many contradictory therapeutic opinions can be discussed in detail. The author of a modern text-book on urology has the audacity to intimate that no treatment is required, at least he specificially states that the disorder is self-limited, the concurrent urethral suppuration merely representing an effort of the tissues to eliminate the invading microorganism. Similar absurd statements accredited to various writers abound in the literature. Author number two, who is one of the foremost urologists in this country, is said to have recommended a prolonged sojourn in Europe, at the seashore, or in the mountains as a rational therapeutic measure in chronic, intractable cases; and he further declares that he has never known the diplococcus of Neisser to survive in the male urethra more than three years, the instances being few where it survived longer than eighteen months, and that in ninety per cent. of cases with or without treatment it disappeared within a year. Number three, also under the evident misapprehension that the disorder is strictly self-limited, states that if the patient be kept in bed for a sufficient length of time recovery may be confidently expected without treatment. Number four and many others have reported cures from strict observance of certain dietary rules supplemented by copious ingestion of diuretic mineral waters.

Strange to relate, medical practitioners may still be found who insist that local treatment is superfluous, and who depend entirely upon internal exhibition of various drugs, claiming universally satisfactory results with freedom from complications and sequelæ by this method of management. It is also insisted that complications and sequelæ represent the logical results of extension of microbic invasion due to unwise and unwarranted urethral instrumentation in attempted alleviation of the local symptoms. The urethral suppuration is regarded as unimportant and not entitled to consideration in so far as treatment is concerned. There are also those who compromise, and in addition to active systemic medication suggest the wisdom of employing local injections of hot water, hot saline and boric acid solutions merely for the "cleansing and stimulating effects" upon the inflamed urethral mucosa.

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* In 67 patients examined (Lofaro) the organisms were found in the blood in 58.2 per cent. of acute and chronic cases; in 100 per cent. of chronic cases with stricture; in over 66 per cent with glandular involvement; in over 73 per cent. with epididymitis.

From the contrary standpoint the majority of modern observers agree with the immortal Ricord that the disease is not self-limited, that it will never cure itself, that when once it has developed no one knows when and where it will stop. And, *en passant*, the observation is pertinent that this axiom practically represents the total of ancient and modern therapeutic understanding. The literature contains hundreds of examples where gonococci, after remaining within the human economy many years, still retained their virulency and capability of conveying the disease under favorable circumstances; and this statement is applicable to patients who had been treated for weeks or months and discharged cured. However, in the majority of instances the medical practitioner admitted that there might still be found in the urine "a few inoffensive and innocent shreds." That in some cases these apparently innocuous filaments contained the requisite contagium was proven by the disastrous consequences which followed belated marriage. "The periods of latency may be of very long duration; in some instances, ten years, yet microscopical examination proved the presence of Neisserian diplococci, which must have retained their vitality for this period." An instance is cited in which the disease was contracted twenty-six years previously, and for twenty-four years "the patient had lived a perfectly upright and moral life," yet active Neisserian organisms were still demonstrably present in the prostatic secretion. Cases in which with or without treatment the diplococci persisted in the urethral exudate for three or four years are numerous throughout the literature.

In this connection the pertinent fact must not be permitted to pass unobserved that the "diplococcus of Neisser duplicates itself every ten minutes," and within forty-eight hours after entering the anterior urethra the organisms may have penetrated the epithelial layers of the mucosa, also the crypts, glands, follicles, etc., and secondary systemic invasion may occur at any time thereafter through the surrounding vascular and lymphatic channels. The observation is also important that diplococci remaining latent in the urethral mucosa "may come to the surface now and then" when their proliferation is stimulated by instrumentation, alcohol or sexual excess; they may be deeply situated in the submucous infiltrate and in the glandular structures; their vitality may be retained for years (exact period unknown).

In not an inconsiderable number of instances (percentage undetermined) with or without treatment the posterior urethra also becomes involved from contiguity of structure, further extension of the organisms producing prostatitis, seminal vesiculitis, orchitis, epididymitis; and rarely cystitis, ureteritis, pyelitis and nephritis. However, in the light of present pathologic understanding, it appears questionable whether renal implication under these circumstances is ever due to the so-called "ascending infection"; more than likely it is invariably either hematogenous or lymphatic in origin. It is also believed that sufficient proliferation of the organisms within the vesica urinaria to provoke serious inflammation is exceedingly rare, unless marked urinary changes have already ensued when the diplococci gain entrance to the viscus.

Abortive Therapeusis: The literature contains much interesting information with respect to the so-called "abortive treatment" of gonorrhea, but there is still no consensus of opinion concerning the most appropriate method of procedure nor the most effective therapeutic agent. Author number one claims that methylene blue internally administered will effect a cure within four to seven days, that to the causative diplococcus it is especially fatal, and other bacteria also promptly succumb, therefore the treatment may be legitimately classed as abortive. Number two uses silver nitrate (1:200 to 1:500) for copious urethral lavage, with uniformly successful results. Number three reports nearly five hundred cases treated by his "abortive method," many patients being cured within twenty-four hours and ninety-five per cent. within six days. Injections of four per cent., two per cent. and one per cent. solutions of silver nitrate are employed at twenty-four hour intervals. Number four claims that if the patient be thoroughly purged there is no risk in abortive treatment from the time of first observation, that he would as soon think of delaying local measures in this disease as he would in "purulent ophthalmia" (ophthalmitis). Number five employs "continuous injections" (thirty treatments during each twenty-four hours) of silver nitrate solution of gradually increasing strength, and under this plan the disease subsides within three to five days. Number six uses copious irrigations of hot water (115° to 120° F.) and reports cures in all stages of the disease within one to three weeks.

Number seven is enthusiastic over the results obtained by his so-called "sealing-up" method of abortive treatment. Argyrol five per cent. is injected into the urethra and the meatus urinarius then sealed with collodion. It is claimed that the procedure is devoid of danger and in ninety per cent. of cases a cure is obtained within five days. Number eight says abortive measures are effective if applied before the clinical symptoms have attained their full height and while the diplococci are still extra-cellular. Edema, meatal swelling, severe pain on micturition, with cloudy urine, are contraindications. Treatment must be instituted before the disease has existed more than two days. He irrigates the entire urethra with weak silver solution warmed to body temperature, and claims the diplococci disappear in one to three days in fifty per cent. of cases. For aborting the disease number nine specifies the following (a) a syringe of 12 cc. capacity, (b) a solution of protargol one per cent., (c) another of two per cent., (d) ichthyol solution one per cent.; the protargol injections are given by the operator at noon and late in the evening and retained ten minutes; at eight A. M. and six P. M. the patient injects the ichthyol which is retained two minutes, provided pain and congestion following the protargol have subsided. Satisfactory results are claimed. The author states that internal medication is unnecessary, although salol may be given. While he employs abortive treatment, number ten objects to the method because of (a) the limited number of cases in which it can be successfully applied, (b) the danger of producing irritation and consequent complications. Abortive injections of four per cent. protargol have produced epididymitis and other complications; even prophylactic injections or concentrated solutions sometimes cause "annoying and persistent inflammations." In abortive treatment he uses three-fourths of one per cent. protargol for copious lavage which unfolds the urethral mucosa and destroys the diplococci situated in the superficial layers; but to be successful the treatment must be instituted early, preferably within twenty-four hours after the onset. The diplococci disappeared the second or third day in seventeen out of twenty-five cases. "The cause for failure in some cases was the fact that the organisms had already penetrated too deeply to be reached by the irrigations. The abortive treatment cannot be harmful when the irrigations are performed with weak solutions."

Curative Local and General Therapeusis: Anything approaching a complete review of the general treatment of gonorrhea would require hundreds of pages, therefore the views of only a few observers will be excerpted. According to author number one, the disease is treated either (a) by letting it alone, (b) by balsamics, (c) by local antiseptics, (d) by mechanical means, (e) by caustics and operations, or (f) by serotherapy. The first two methods are dismissed as being pusillanimous; the last is of value only in complications. The others, with one exception, have only occasional indications; they are generally harmful. The exception is the application of local antiseptics, which remains the safest and most effective method of treatment; but by this means all the diplococci in the tissues cannot be actually destroyed, since those deeply located cannot possibly be reached by any external medicament. "We simply destroy the superficial organisms and thus prevent reinfection, at the same time allowing the protective powers of the body full opportunity to overcome the deeper seated infection."

Number two recommends irrigation of the anterior urethra, in the acute stage, using five to six pints of potassium permanganate solution at temperature of about 100° F. "Hydrostatic pressure of six feet (?) will sufficiently dilate the urethra to expose all the folds." Excellent results are claimed by this method. "The reason irrigation has not gained more recognition is that both insufficient pressure and insufficient fluid have been used."

Number three mentions a procedure which would be ideal, but unfortunately is not feasible, viz., a button-hole opening in the perineal urethra to divert the urine and permit effectual local medication to the anterior urethra which at first is the only portion involved. The procedure is not recommended as justifiable, but by accident the author was able to employ it three times in the same individual whose urethra was perforated by ulceration just anterior to the peno-scrotal angle. Urine passed through the posterior opening; the isolated and inflamed anterior urethra was irrigated from behind forward with two per cent. protargol, then swabbed with ten per cent. strength, and packed tightly with iodoform gauze; treatment repeated twice daily for four days. Within eight days the organisms had disappeared and the discharge had ceased. In two subsequent attacks silver nitrate solution was employed, a cure resulting within seven days.

Number four claims that there are numerous objections to the ordinary methods of local treatment. In hand injections much of the antiseptic solution is lost, and the patient has difficulty in retaining the fluid the required time owing to "cramping of the fingers compressing the meatus." The more complicated procedures, such as irrigations with various antiseptic solutions, etc., are successful only when administered by the physician, and are therefore unavailable to patients who "for reasons of secrecy cannot be seen visiting the doctor's office." To overcome these objections the patient is taught to use the "glass-bell-suction-injection-apparatus," one-half of one per cent. protargol, one per cent. acetate of lead or zinc sulphate being employed three to five times in twenty-four hours.

Number five deplores the fact that if treatment be discontinued too soon the diplococci will attack new foci and a cure will be all the more difficult; on the other hand, if treatment be unnecessarily prolonged a discharge due to irritation will persist so long as it is treated. The aspect of absolute cure varies with the treatment employed. "A favorable sign is when on separating the lips of the meatus they open progressively from before backward like two leaves of moist paper." Under antiseptic treatment if a cure is not effected the discharge reappears within two to seven days. Balsamic treatment is deceptive, merely "drying up" the discharge which reappears when the drug is diminished or discontinued.

Number six exhibits the extreme limit of therapeutic audacity by declaring the disease may be cured by internally administering to the patient his (or her) own urethral (or vaginal) pus; moreover, that the pus is not only effective in curing the disease when once established, but possesses prophylactic power in the highest degree. Several instances are cited where the disease was cured, and others where its development was prevented, by internal administration of the "discharge" mixed with powdered sugar, one cubic centimeter every half hour until three doses had been taken; also where the discharge was collected and placed upon the tongue to be intermixed with saliva and swallowed; and where the pus was administered in ounce doses mixed with water. "We shall eagerly await other developments of this auto-therapeutic method of treating such virulent processes as Neisserian infection. Next we shall probably be told that syphilis may be cured by trimming the chancre from the patient's penis and giving him the delicate morsel to eat."

Number seven regretfully admits what every practitioner of average experience already knows, viz., that there has yet been discovered no specific drug nor method of treatment, and believes more satisfactory results will accrue when such ideas are abandoned and the disease studied individually. For internal administration he favors pure sandalwood oil or fluid extract of zea two teaspoonfuls every two hours, or sodium bicarbonate one teaspoonful every four hours; locally, sitz baths, application of heat, drainage, urethral lavage with hot water or hot boric acid solution every two hours during the day and every three or four hours at night. Where infection has extended beyond the sphincter hydrostatic irrigation, which permits the fluid to enter the bladder and thus cleanse the posterior urethra, should be substituted. "As yet no drug is known which is bacteriotropic for the diplococcus of Neisser and non-organotropic for the epithelial cells; therefore, until all acute swelling (edema) of the urethral mucosa has subsided there should be no local medication except boric acid solution or hot water." Later he recommends argyrol twenty per cent., or protargol one per cent.; permanganate of potassium 1:6000 or 1:2000, or nitrate of silver 1:10,000 or 1:3000. Absolute rest in bed with modified dietary; abstinence from alcoholic beverages. Most patients are cured within two weeks with the minimum percentage of pathologic after-effects.

Vaccino- and Serotherapeusis: This commentary would be incomplete without reference to the two latest therapeutic suggestions, viz., vaccine and serum treatment. In brief, vaccinotherapy contemplates inoculation of the subject with living or dead bacteria, whereas serotherapy signifies introduction into the system of blood serum from an animal previously inoculated. In so far as the therapeusis of acute Neisserian urethrorrhea is concerned, i. e., where bacterial invasion is limited to the urethral mucosa, either method would appear equally as irrational and absurd as "internally administering to the patient his own urethral pus," yet there are those in the profession who claim to have secured the most marvelous results from the administration of vaccine and serum in all stages of the disease. It must not be forgotten, however, that medical statistics are not always reliable, and that statements concerning new therapeutic measures may be based upon superficial observations of inexperienced and obscure authors.

The premise is tentatively admitted that where glandular, osseous, myogonic or visceral lesions have supervened from systemic invasion of the gonococci, beneficial effects may reasonably be expected to accrue from the intelligent application of vaccino- and serotherapeusis. However, these so-called advanced methods of treatment are yet in their infancy, and their indications, contraindications, limitations, etc., are imperfectly understood. Until the surrounding therapeutic atmosphere has been clarified by greater knowledge obtained by the crucial test of mature observation and practical experience, vaccines and serums should be recommended with hesitation and administered with discrimination.

Since the majority of the data embraced in the foregoing commentary have already appeared in medical print, I wish to acknowledge my indebtedness and accord due credit to the various authors and publishers, with thanks for the privilege exercised in epitomizing and reproducing the material. While the appended list of references is in some respects incomplete, it shows in a general way the sources from which the data were obtained.

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THE NATIONAL BOARD OF MEDICAL EXAMINERS.

The National Board of Medical Examiners held its first examination from October 16 to 21, 1916, in Washington, D. C.

There were thirty-two applicants from seventeen states, representing twenty-four medical schools. Of these sixteen were accepted as having the necessary preliminary and medical qualifications, ten of whom took the examination. Five of them passed.

The second examination will be held in Washington, June, 1917. Further information may be had by applying to Dr. J. S. Rodman, secretary, 2106 Walnut street, Philadelphia, Pa.

GONORRHEAL LYMPHANGITIS OF THE PENIS.

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Lymphangitis of the penis is always secondary. While in some cases it is non-specific, it is usually of venereal origin. Gonorrheal lymphangitis (called "bull head clap" by the laity) is the most troublesome and frequent form of lymphangitis of the penis. It most often occurs between the onset and fifth day of the discharge from the meatus, and is characterized by edema and swelling of the loose skin forming the prepuce, eversion of the meatal lips with reddening of the surface of the glans penis and the involved skin of the penis. The swelling may extend to the pubes, and in the most dependent portion of the penis reach a diameter of four inches. The severity of this condition depends upon the length of time it has been allowed to progress together with the encouragement the patient has given it by the use of astringents, etc., to retard the already inadequate drainage.

To sum up the causes of gonorrheal lymphangitis of the penis—it is the absorption of toxines from gonorrheal pus due to improper drainage from the anterior urethra, caused in most cases by (1) an abnormally small meatus, 20 French scale and under, (2) vigorous use of astringent injections, (3) coitus while suffering from an acute anterior urethritis. The most aggravated forms are usually a combination of the small meatus and the astringent "three day cure," independent of coitus.

Treatment: Establish drainage; lessen the severity of the urethritis.

Perform meatotomy at once if the pressure from the edema will not interfere with keeping the incision open, making the meatus as large as 25 French at least, cauterizing the edges of the wound with 10 per cent. silver nitrate solution, then insert within the meatus a pledget of cotton steeped in sterile olive oil. A fresh pledget of cotton is to be reinserted after each urination in order to keep the raw surfaces from healing together.

When the edema is too severe to allow the wound to be kept apart with the cotton, give some internal antiseptic, preferably urotropin, gr. V every four hours, and direct the patient to drink large quantities of water. I find that the patient gets my meaning better when I tell him to drink as much as seven glasses of water an hour, then he comes as near this quantity as possible with comfort. Irrigate the anterior urethra with 1:4000 potassium permanganate solution twice daily, or use injections of one-quarter of 1 per cent. aqueous solution of protargol three times each day. First have the patient void his urine. Use a two dram syringe and hold each injection in the urethra for three minutes by compressing the meatal lips. Perform meatotomy as soon as the condition subsides enough to allow the lips of the meatus to be kept apart during the healing of the wound.

If you find upon presentation of the patient that the edema is just beginning, perform the meatotomy, treat the urethritis, and the lymphangitis will disappear in two or three days. On the other hand, should the lymphangitis be complicated with a phimotic condition of such a degree as to prevent exposure of the meatus, a dorsal incision is called for and should be made at once under local anaesthesia; treat the meatus according to the conditions as outlined above.

The longer the lymphangitis persists, the more difficult it is to clear up the edema. Keep the preputial sac clean, control the pain with hot sitzbaths, hot towels wrung out in saturated epsom salts solution, or applications of lead and opium wash. Rest in bed with the penis elevated would be ideal, but this cannot always be done without greatly hampering the patient's business affairs. When the patient cannot go to bed I suspend the penis with a "T" bandage until the acute symptoms disappear. Should he complain of much pain on urination, direct him to void his urine while in the sitzbath with the penis immersed. Have the patient get all the benefit that can be obtained with the hot applications and hot sitzbaths, as moist heat is about the only friend a man has when he is suffering from pain of gonorrheal origin.

In some cases a hard ring is left in the loose tissue when the acute symptoms subside. This is painless and disappears either spontaneously or with gentle massage daily while in a hot sitzbath. Evidence of these rings may be present for two or three weeks after all acute symptoms have disappeared.

The troublesome erections are best controlled with suggestion and cold applications at the time of the erection. I never use potassium bromide or any sedative, for they at times do more damage than good, as they inhibit the action of the ciliated epithelium lining the vas deferens, thereby encouraging epididymitis.

Should pus form in the swollen tissue, evacuate it with a free incision, curette and pack, allowing the wound to heal from the bottom. This condition is rare and should the patient come for treatment early enough the procedures herein outlined will avoid the pus formation. Some cases of bubo developing are on record. These should be treated symptomatically.

I have selected the following histories from my records to illustrate the main points.

Case I. H. C. Barber, age twenty-six, September, 1915. Gonorrhea for six weeks. After "night out" noticed absence of discharge, swelling of penis. Examination: Meatus 18 French, prepuce swollen to twice the normal size of penis. Treatment: Meatus opened to 32 French, irrigations of 1:4000 potassium permanganate solution twice daily. Lymphangitis disappeared completely third day.

Case II. J. E. McE. Lineman, age twenty-five, April, 1912. Acute gonorrheal urethritis with lymphangitis for ten days. Examination: Meatus 12 French, penis swollen to pubes, nine inches from pubes to distal end, four inches in diameter in most dependent portion. Treatment: Urotropin gr. V every four hours, large quantities of water, injections of one-quarter of one per cent. protargol solution t.i.d., penis elevated with "T" bandage. Lymphangitis began to subside on fifth day so as to allow meatotomy, meatus opened to 25 French. Injections discontinued, then vesical irrigations of 1:4000 potassium permanganate solution. Lymphangitis cleared up in ten days leaving two hard rings which subsided spontaneously as the treatment of the gonorrhea progressed.

Case III. J. C. D. Nurse, age twenty-four, February, 1916. Acute anterior gonorrheal urethritis for two days. Previous treatment: Two injections of a "sure shot" recommended by a druggist. After first injection noticed swelling of penis. Examination: Meatus 15 French. Penis swollen to twice normal size. Treatment: Meatus opened to 25 French, protargol one-quarter of one per cent. injected t.i.d. Lymphangitis disappeared in seven days.

Case IV. W. C. Fireman, age twenty-seven, referred by Dr. S. D. Armstead, Foley, Ala., September, 1915. Gonorrhea for ten weeks. Lymphangitis for three weeks, coming on after strong indulgence with "wine, women, and song." Examination: Phimosis that prevented exposure of meatus, penis swollen to three inches in diameter, swelling extending to pubes. Treatment: Dorsal incision, meatus found to be 22 French, opened to 30 French. Hot sitz-baths, applications of lead and opium wash, urotropin gr. V every four hours, vesical irrigations of potassium permanganate solution 1:4000 twice daily. Acute symptoms cleared up in eleven days, when patient left the city.

Case V. E. T. Inspector, age thirty, referred by Dr. G. W. Newburn, Prichard, Ala., August, 1916. Gonorrhea for four weeks. Examination: Penis swollen to twice normal size, meatus 25 French. This patient admitted to me that he was assisting his doctor's treatment, using patent medicine injection, with the idea that the more treatment the better. Under proper treatment of the gonorrhea, the lymphangitis cleared up in five days.

Case VI. J. B. S. Barber, age thirty, September, 1916. Gonorrhea for twelve days. Lymphangitis first symptom noticed. Examination: Meatus 10 French, penis swollen to twice normal size. Urethritis treated; third day, meatotomy, 25 French; tenth day, lymphangitis entirely cleared.

FRACTURES OF THE LOWER END OF THE HUMERUS.*

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Fractures of the lower end of the humerus are very common, and there has been much discussion as to the best methods of treatment to prevent a stiff elbow. As a matter of fact, however, permanent ankylosis is rare, and, excepting in certain compound and complicated fractures, the results are good as to future function provided proper treatment has been employed.

There are several reasons for the existing erroneous impression concerning the ultimate outcome in these fractures: First, fractures in children, which should be considered separate and distinct from those occurring in adults, are unwisely classified as the same. Second, the exact lesion may not be well understood, or may be improperly diagnosed. I am aware of no fracture where more careful study is necessary to determine the exact character of the lesion; and, of course, special fractures require special treatment. The results would certainly be unfortunate if all these fractures were to be treated alike, that is, upon the basis of one definite lesion. Third, the surgeon has probably been too prone to judge the final result six or eight weeks after the fracture has occurred. One might then conclude that the outcome was a very bad arm, yet if he were to see the same arm twelve to eighteen months later he would be surprised to note the excellent function, with little or no deformity.

In the consideration of these fractures, I deem it consistent to discuss them separately so far as may be possible. The T-shaped fracture is one of the worst that can occur at the elbow joint. It may present the same appearance as a supracondylar, with just a line of fracture extending into the joint, or the pieces of bone may become widely separated thus permitting the humerus to slip between the fragments. The diagnosis of T-fractures may be extremely difficult where there is no separation and the ligaments are intact, and oftentimes such lesions are treated as supracondylar fractures, the surgeon being unaware of the extension into the joint until this feature is revealed by *x*-ray examination. Crepitation as a diagnostic sign is practically worthless in this variety of fracture, for the crepitus obtained is usually in the upper line of the fracture. On the other hand, it may not be a T-fracture, it may merely be one of the condyle. If there is sufficient separation of the fragments to produce widening of the joint, the diagnosis is generally easy; nevertheless, the enormous swelling which is usually present may be mistaken for separation of the fragments.

In the treatment of this fracture the method employed must be the one best adapted to the individual case. Unquestionably the best apparatus to be applied to the normal contour of the arm is a straight splint, or a straight cast from the axilla to the hand, with lateral pressure over the condyles to hold them in proper position. In speaking of straight splints, it is, of course, understood that I mean that the arm should be slightly flexed in order to place all the muscles at rest. However, by the application of this method of treatment one is always confronted with the possibility of ankylosis with the arm in a useless position. Personally I have not had ankylosis occur in any case. The patient should be closely watched, then in five or six days remove the splints, steady the joint with one hand and with the other make slight motion, but never beyond the point of resistance. This is repeated every few days, the motion being gradually increased, until the arm is well.

If these points are carefully observed a stiff joint is not likely to occur. I believe the cases of ankyloses that are brought before the surgeon are the result of former methods of treatment, in which the joint was permitted to remain in one position too long.

As a rule supracondylar fracture is easily diagnosed. The line of fracture is most commonly upward and backward, and the displacement is usually backward, but may be forward and may occur at any point, generally just above the condyles. If one grasp the humerus with the left hand and the forearm with the right, in posterior displacement movement is possible in all directions excepting flexion. It must be borne in mind that the condyles move with the forearm, and crepitation will almost always be noted. The condyles show no broadening, their relationship one to the other is normal. The backward displacement is usually not unlike that in backward dislocation; but the angle of the olecranon is more acute and the tip of the olecranon is out of normal relationship with the condyles, dislocation not carrying the condyles with it as does fracture. The lower end of the shaft may be felt forward of its normal position, and the deformity recurs after reduction. If the displacement is forward, the end of the shaft will be above the olecranon, the elbow will be in front and not behind the general direction of the shaft, and extension and flexion will be limited. In no case of supracondylar fracture will there be found any interference with pronation and supination.

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*Read before the West End Medical Society, of Louisville, Ky.

In the treatment of this fracture one may use either the straight splint, the internal angular splint, flexion (Jones), or the Osgood-Penhollow splint. Unless there is some special contraindication, I like Jones' position, but do not use forced flexion. After reduction the arm should be flexed to the extent that the muscles by pressure will neutralize the contraction of the extensors. In using forced flexion the bone is almost sure to be bent anteriorly. The arm should be kept at an acute angle for about one week, then gently placed at right angles and maintained in that position by both anterior and posterior angular splints for about two weeks, then all splints may be removed and the patient advised to practice both active and passive motion.

In more extensive oblique or spiral fractures where the deformity tends to recur, I would recommend as a special appliance the Osgood-Penhollow splint which can be made of plaster of Paris. This splint not only holds the fragments in apposition, but also exerts traction. It should be borne in mind that not only the longitudinal lines must be restored to normal, but the fragments must be manipulated so as not to permit rotation of the lower fragment upon the shaft. Another admirable method of treatment in this fracture is a plaster of Paris splint molded to fit snugly around the shoulder and the condyles, the arm being then placed at an obtuse angle. This angle will afford relaxation to the muscular structures and prevent backward bending at the site of fracture. At the same time the cast fitting snugly over the shoulder and the condyles will prevent rotation of the lower fragment upon the shaft.

As to fractures of the condyles: Most authors state that fracture of the external is much more frequent than of the internal condyle; in fact, they speak of the internal condylar fracture as being very uncommon. In my experience fracture of the internal condyle has been quite as frequently encountered as the external, and the injury is much graver than that of external condyle fracture The prognosis as to deformity and also function is much more unfavorable than that of the external condyle fracture. These fractures are caused usually by direct violence, or by falling upon the hand, driving the head of the radius against the external condyle, or the upper end of the ulna against the inner condyle as the case may be.

Fracture of the external condyle usually extends from about the middle of the joint upward and outward on a line of varying obliquity. If there is displacement it is apt to be backward and outward Sometimes without rotation the fragment is held in almost normal relationship to the head of the radius. There will be found swelling of the outer side of the joint only, and tenderness about the outer condyle with crepitus in the same region. There is little or no swelling or ecchymosis on the inner side, and naturally there is no deformity except broadening. Many writers speak of limited supination and pronation, but I have observed no appreciable diminution; moreover, interference of this kind would argue against high fracture. Flexion and extension are limited only by pain.

In fracture of the internal condyle, the symptoms are practically the same, save the following: on the inside of the arm greater lateral displacement is noted, there is greater lateral and anteroposterior motion, also considerable adduction instead of abduction of the forearm.

Fracture of the external epicondyle rarely occurs, and personally I have never encountered such a case. On the other hand, fracture of the internal epicondyle is common, and may be produced by either violence or muscular action. The epicondyle carries the origin of the superficial flexors of the forearm, and the attachment of the lateral ligament, but the location of the latter is so close to the base that it seldom suffers any interference.

Fracture of the capitellum is quite uncommon Occasionally it occurs, and when it does the trochlear surface can be felt anteriorly as a foreign body if displacement has ensued. There is no interference with either pronation, supination or extension, but rarely can flexion be made beyond right angles, which is attributed to blocking of the joint by the misplaced bone. The bone may slip back into place during flexion and not interfere with motion. The proper treatment is to remove the piece of bone.

The other and more severe fractures, such as the comminuted and the compound, are usually due to direct violence which crushes the joint. As to the treatment of these fractures, I can only say use the appliance which seems best suited to the lesion present. Some will require straight splints, others plaster of Paris, still others flexion, or it may be that a combination of these methods will be productive of the best results In the hands of the most skilled surgeon the joint may become ankylosed, and resection will be later required to give the patient a useful arm

In fractures of the lower end of the humerus in children under twelve years of age, the results are almost invariably good, for the reason that ossification in this particular situation occurs late in life; for instance, in the external condyle it may be as late as the seventeenth or eighteenth year. For that reason fractures in children are less frequent than epiphyseal separation, thus it follows that in most cases there occurs an epiphyseal separation rather than a fracture, and when reduced the fragment remains in place much more readily than a fracture. Therefore, the treatment is less complicated and the results more favorable in children than in adults.

Lest to some it may seem that I have deviated from the former method of treatment as regards early motion, let it be remembered that the elbow is a complicated joint, with a tendency to ankylose when involved in fracture; therefore, special treatment is advised in special cases. I have stated on previous occasions that the more motion produced either by the muscles or by the bone itself at the site of fracture, the more exudate; hence, the more callus formation, and the least amount of function when the joint is involved, which is unquestionably true; but I believe at the elbow joint early motion is advisable, as it seems preferable to take the chances of the exuberant callus being absorbed than to have permanent ankylosis.

Local Anesthesia.

A knowledge of the relative sensibility of various tissues and organs of the body is essential for the proper performance of operations under local anesthesia. Detailed descriptions of the sensibility of these various structures can be found in the works of Lennander, Block, Schleich, Braun, and others. In general it may be said that all parts of the body which receive their nerve supply from the cerebrospinal nervous system are sensitive, in a more or less degree, to pain, while those organs which receive their innervation from the sympathetic nervous system are insensitive. The abdominal viscera, the lungs, and the brain are insensitive. The skin, on account of its richness of nerve supply is probably the most sensitive organ of the entire body. The sensibility of the skin differs, the most sensitive being the finger tips and the least sensitive on the back.—J. H. Jacobson in *The Journal of the Michigan State Medical Society.*

AN INSTRUMENT FOR APPLYING SILVER-CLIP HEMOSTASIS.

Harry M. Wegeforth, M.D.,
Paul Wegeforth, M.D.
San Diego, Cal.

The use of silver clips to secure bleeding points that prove awkward to handle by means of ordinary string ligatures, has been attempted by very few of the surgical profession. This, we believe, has been due to two main reasons, the more important of which seems to be a hesitancy on the part of operators to leave unabsorbable material in the tissues, an objection which is held by many in regard to the use of silk for ligatures and sutures in clean wounds. The amount of metal necessary for securing even large vessels, however, when compared to that commonly used in plating or wiring a bone, is quite small, and assuming the wound to be a clean one, it can be cared for by the tissues with practically no reaction. Indeed, the insult offered to the tissues by these small particles of foreign material is much less than that occasioned by the tearing and stretching of structures which so often follows the attempts to place a tie around a deep bleeding point. The other obstacle in the way of increasing the use of silver clips is the lack of a suitable instrument with which to apply them. The instrument used at the Peter Bent Brigham Hospital in Boston by Dr. Harvey Cushing, the originator of the method, and at the Johns Hopkins Hospital, Baltimore, by Doctors Crowe and Heuer, carries but one clip and consequently must be loaded repeatedly during an operation, a procedure which at times becomes cumbersome, especially when severe bleeding is encountered and the vessel is not caught on the first or second attempts.

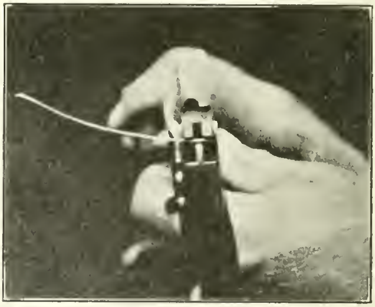

Fig. 1.

It has been our purpose, therefore, to construct an instrument that will be suitable for use in deep cavities and designed to carry and automatically load a sufficient number of clips to allow repeated attempts to be made in permanently securing a vessel without the operator's attention being distracted by the necessity of reloading.

Briefly, the technic consists in slipping a silver clip or staple, held in the jaws of a suitable forceps, over the bleeding vessel. The clip is then crushed and left hanging to the vessel which it has secured, no attempt of course being made to remove it at the termination of the operation.

The material used in making the clips is twenty-two gauge silver wire. Since clips made from ordinary round wire do not maintain their position well in the magazine, we have found it convenient to use the ribbon variety, the cut surface of which is square. To insure uniformity in the size and shape of the staples, an instrument was designed for folding them. For this purpose the jaws were removed from a pair of wire cutting pliers, and replaced by a set of interlocking teeth as shown in figure I. A piece of wire can be inserted crosswise between the teeth when the jaws are open, the end being arrested on the outer side by a smooth flange attached to the lower jaw. On the inner side there is a knife blade which, when the jaws are shut, cuts a piece of wire of sufficient length to form the staple. By the same motion, the wire is engaged between the teeth and upon further closure of the jaws it is folded into its proper form (figure 2).

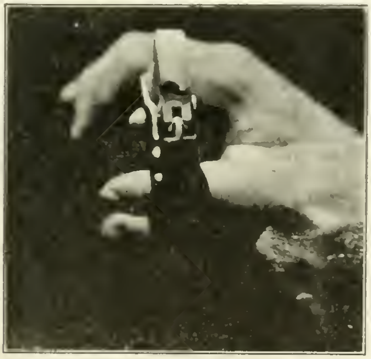

Fig. 2.

The staples are 3 m.m. broad and 5 m.m. long.

Before cutting the wire into clips, it is well to roughen the side which is to form the inside of the clip, so that its grip will not slip when it is applied to tissue. This can easily be done by running a gnurler over any one of the four sides.

In outward appearance, the clip carrier (figures 3 and 4) resembles an alligator forceps on the principle of which it was modeled. The shaft, however, instead of being solid, is hollow and serves as a magazine. This magazine is 14 c.m. long, 3 m.m. high and 1 m.m. broad, and is formed by two grooves of equal depth on the opposing surfaces of the rods forming the shaft. At the outer end, the chamber opens into the jaws of the instrument onto which the grooves are continued. Within, there is a small metal plunger connected with a wire which runs backward in the upper grip to a button (D) which can be manipulated by the thumb, by means of which arrangement the clips are pushed forward into the jaws for use.

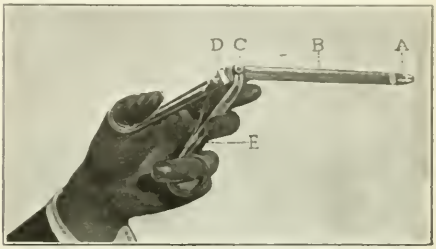

Fig. 3.

The requirements of the jaw arrangement are as follows: First, the clip when shoved forward from the magazine must come to rest in a position for use at the extreme tip of the instrument; second, in closing, the jaws must crush the clip completely so that an open slit between the staple legs will not be left when the jaws are released; third, the second staple in the line must be used for pushing the first one into position, but must be protected from injury when the jaws clamps down on the first clip. These conditions are met by the construction of the grooves within the jaws.

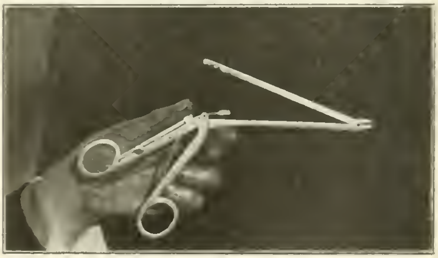

Fig. 4.

In order that the staple when shoved forward from the magazine will not be projected beyond the jaws, these are so constructed that they are prevented from opening more than 2.5 millimetres or slightly less than the width of the staple. To arrive in position, the clip is pushed forward with each leg lying in a shallow groove on the opposing surfaces of the jaws. At the extreme tip these grooves end abruptly which checks further progress of the staple, and bring it into position for use, with its opening forward and its tips almost flush with the lips of the jaw. The grooves at this position are of a depth equal to only half of the diameter of the silver wire from which the clips are made, so that a considerable portion of the clip legs project above the surface, which insures complete crushing when the jaws are closed.

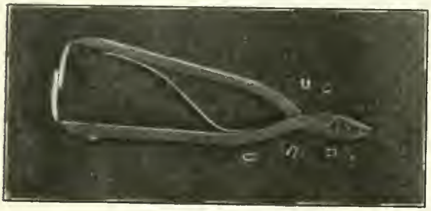

Fig. 5.

In order that the second staple will not be subjected to the crushing action of the jaws when they are brought together, the upper groove is deepened behind the first staple, forming a depression into which the second staple slips when the jaws are closed. To prevent the relative position of the second staple to those following being altered, this deep portion does not extend backward from the end of the first staple more than three-quarters the length of a clip so that the back part of the second clip is still fitted in the foremost part of the magazine.

The loading is done through a slot in the upper surface of the barrel through which the clips can be introduced into the chamber when the plunger is drawn back.

A second instrument (figure 5) has been designed for pelvic and abdominal work. It is essentially the same as that just described, the principal difference being, aside from its shape, that the magazine is contained in the one grip and extends forward well into the jaws.

St. Joseph's Hospital.

When called to treat a case of abortion do not be in a hurry to examine the patient. First clip the vulvar hair, scrub the vulva and then scrub your hands or slip on a sterilized glove. Omission of these precautions may convert a clean into a septic case.

Precautions in Caudal Analgesia.

Before injecting the analgesic fluid we must be sure that the needle has not entered the spinal canal or one of the large veins constituting the plexus about the cauda. If the spinal canal has been entered spinal fluid will usually escape after the withdrawal of the obturator from the needle, while, on the other hand, if a vein has been punctured blood will drop from the needle. If neither blood nor spinal fluid escape, the analgesic fluid still should not be injected until we have tested the location of the end of the needle by injecting a few drops of normal saline solution through it. The authors have had a very unpleasant warning on this point which could have been obviated by such preliminary injection of saline solution. In this case the needle was introduced in the usual manner and injection was begun, but after about 10 c.c. was injected the patient complained of weakness, extreme pain in the head and chest, and his pulse became somewhat weak and irregular. The injection was stopped at once, and, on detaching the syringe, blood was seen to run from the needle. The patient soon recovered and left the hospital about three hours later, feeling very well. In this case the needle had entered a vein, but the blood was retarded from flowing out by a small clot or piece of tissue which had occluded its lumen. If saline solution had been injected before using the analgesic fluid the obstructing plug would have been washed out and the blood escaping from it would have indicated a vein had been entered. If either the spinal canal or vein has been punctured the position of the needle should be changed before injecting the analgesic fluid. Having the needle properly placed, 30 to 90 c.c. of analgesic fluid is slowly injected. Analgesia becomes complete in from ten to thirty minutes, and lasts several hours. By increasing the quantity of fluid the entire sacral plexus may be included.—Bransford Lewis and Leo Bartels in *The Lancet-Clinic.*

The High Forceps Application.

There still remains a relic of bad practice in the fact that the attempt is sometimes made to deliver the unengaged head by forceps. While this may rarely be successful, it often fails, and the unsuccessful attempt frequently leaves the patient wounded and infected. It is difficult to eradicate from the mind of the general profession the belief that one need not wait for engagement and molding for the successful application of forceps; but, until this is abandoned, there will remain from this source a considerable maternal and fetal mortality and morbidity.—Edward P. Davis in *The J. A. M. A.*

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WALTER M. BRICKNER, M.D., Editor

New York, December, 1916.

A SERUM DIAGNOSIS OF ACTIVE TUBERCULOSIS.

It is a general clinical experience that there are several groups of cases in which it is extremely difficult to establish or to exclude an active tuberculosis. Such cases are certain types of chronic bone and joint disease; the adenopathies that may arise from blood dyscrasias, neoplasm, Hodgkin's disease, syphilis or tuberculosis; peritoneal infections of unknown etiology; thoracic affections that may mean syphilis, tuberculosis or new growth; renal affections in which tuberculosis is strongly suspected but may not be demonstrable; obscure acute fevers in which miliary tuberculosis is always to be borne in mind but is notoriously difficult to establish ante-mortem; cases of suspected incipient pulmonary tuberculosis, etc. All these conditions point the need for some clinical or laboratory procedure that will definitely determine the presence or absence of an *active* tuberculosis.

Many tests have been proposed for the early diagnosis of tuberculosis,—the urochromogen test, the Arneth leucocyte count, the employment of tuberculin in various ways, etc. In spite of a rather voluminous literature concerning these methods, the outstanding fact remained that clinicians could find but comparatively small usefulness for them.

Following upon the establishment of Wassermann's epoch-making serum reaction test for syphilis, many attempts were made to establish for tuberculosis a similar complement-fixation test. In fact Wassermann himself, with his co-workers, tried such a reaction, adapted for tuberculosis, and soon thereafter many investigators described similar tests with suggestive results. Except for intermittent studies during the past decade, this subject assumed no especial importance, however, until very recent years, when it was quickened to new interest by the published work of Calmette, Radcliffe and others, Besredka and his followers (Inman, Debains and Jupille, Renaux, Bronfenbrenner), Craig and Petroff. These workers showed that complement-fixation in tuberculosis could give a high percentage of positive reactions in positive cases but not infrequently the reaction was also positive in "healed" or "arrested" cases, in syphilitics who had no evidence of tuberculosis, and in some normal individuals.

This year Hymen Miller and Hans Zinsser announced in the *Proceedings of the Society for Experimental Biology and Medicine,* July, 1916, the successful application of a method for the serum diagnosis of tuberculosis based upon complement fixation in the presence of a dry salt extraction of tubercle bacilli used as an antigen. The results with this preparation as published by Miller (*Journal of the American Medical Association,* November 18, 1916), have been very striking. A high percentage of positive reactions is obtained in positive cases. Only about five per cent. of cases clinically declared "arrested" failed to give negative reactions. (In such cases the von Pirquet test, for example, gives about 100 per cent. positive reactions.) There is no cross-fixation with the serums of luetic or normal people.

A positive reaction with Miller's test indicates absorption from some *active* focus. Unlike the tuberculin tests it does not denote the mere presence of a tuberculous focus, healed or unhealed. A positive reaction is, therefore, an indication for treatment, surgical or medical. What is also very important, Miller has shown that as the patient approaches recovery the reaction loses its intensity, disappearing when the disease is cured.

Miller's test is still young and awaits further trial. It has, however, been employed critically in various institutions, where it has been found quite as useful and reliable as the Wassermann test for syphilis.

This appears then to be another fine accomplishment of the research laboratory, one quite as welcome to the surgeon as to the internist in demonstrating the presence of an *active* tuberculosis, in aiding prognosis, in determining whether a lesion has been cured.—W. M. B.

THE MEDICAL RESERVE CORPS AND THE OFFICERS' RESERVE, U. S. A.

We have received the following communication:

"OFFICERS . . . IN NAME ONLY."

New York, November 10, 1916.

Editor, AMERICAN JOURNAL OF SURGERY:

It is rather discouraging for one who has held a commission in the United States Army for six years, and has been proud to wear the uniform on several occasions when ordered to active duty, to read that members of the Medical Reserve Corps (Inactive) have been sailing under false colors since the creation of the corps by the Act of 1908.

The writer of the editorial in the *Journal of the American Medical Association*, October 28, 1916, must be quite ignorant of the work of the Corps, or else he wilfully ignores facts which are known to all who have read the reports from the Surgeon General's office. I prefer to accept the first explanation, since it is incredible that a medical gentleman should utter such a slurring criticism of a body that numbers among its members physicians and surgeons whose names alone are a sufficient guarantee of their professional attainments and devotion to duty. The obnoxious statement above quoted is not only unjust, but untrue. Some three hundred of the Medical Reserve Corps, who are officers "in name only," have been on active duty since the mobilization began, not only at home stations and in camps, but on the border—in fact, several are still with regular troops in Texas, Arizona and New Mexico. They have performed the duties of regimental and post surgeons, of assistants to sanitary inspectors, and of the personnel of base hospitals, and have so relieved the urgent need of regular medical officers that the Surgeon General's office stated emphatically: "We could not have got along without them."

Only a civilian could have written the harsh criticism of those who were glad to sacrifice their own interests for the honor of the Corps and of their country. They need not care, for they seek only the approval of their chief, but it is not fair to disseminate such views among the members of the American Medical Association, who naturally accept the opinions of its journal as *ex cathedra*. Honest criticism never hurts. Any other is unworthy of a medical man and is resented by "an officer and a gentleman."

H. C. COE.

So far as it applies to Dr. Coe and to a great many others in the Medical Reserve Corps of the army, the statement in the *Journal of the American Medical Association* is inaccurate, but we do not believe that it was intended to be slurring or offensive. While it is true that hundreds of officers in the corps have had training in camps, or actual service, it is also true that most of them have had no training at all. The *Journal of the American Medical Association* was speaking of the corps as a whole, without duly considering the services of a large minority. The statement was made in contrasting the present Medical Reserve Corps, in which training is voluntary and — except for the correspondence course — only occasional, with the now-forming (Medical Section of the) Officers' Reserve Corps, in which training will be obligatory.

The abolishment of the Medical Reserve Corps next June may well be regarded as a recognition by Congress of its usefulness. The medical department of the army is the only branch that has had an established reserve, and the creation of the Officers' Reserve Corps is an expansion of that reserve to all branches of the army. The change in name carries with it no change in the relations of medical reserve officers to the Surgeon-General's office.

Medical Reserve Corps officers who signify to the Surgeon-General their desire to be transferred to the Officers' Reserve Corps may be recommended by him for commission in that corps, for a term of five years, as first lieutenant, captain or major. Commission in the Medical Section of the Officers' Reserve Corps imposes certain obligations that have not applied to the Medical Reserve Corps, viz., attendance at training camp for a period of fifteen days every year, and completion of the correspondence course. All officers are subject to call for active duty if war is declared *or imminent;* first lieutenants may be ordered to active duty, with their consent, in time of peace.

We fear that these obligations will deter many, especially of the older, busier members of the Medical Reserve Corps, from seeking transfer to the Officers' Reserve, however great their patriotic inclination to do so. For those whose varied professional activities leave scant spare time, the correspondence course would be burdensome. A fortnight's voluntary attendance at camp at a convenient time each year would, for most medical men, be no great hardship, even though without remuneration; indeed, it is a fine sort of vacation. But camp training without choice of time will be impossible to many medical men without the neglect of other important professional obligations. Thus, in one hospital surgical service, all three of the attending surgeons are officers in the Medical Reserve Corps; and it is hardly conceivable that the directors of the hospital would consent to the neglect of that service by the simultaneous absence at camp of all three of the surgeons for fifteen days every year in times of peace.

Adequate training of reserves is, of course, essential. In the purely military departments of the army, reserve officers without experience and technical training would, indeed, be "officers in name only." In the medical department, military training is also very desirable, but not so important, for, in war, most of the work of the reserve and volunteer officers would be medical, for which the technical training is acquired in civil practice, and the rest can be learned. This is especially true for those whose experience would naturally call them to the care of sick and wounded men in base hospitals. We would not for a moment gainsay, indeed, we quite recognize the desirability of training medical reserve officers in map reading, the selection of field and evacuation hospital sites, the establishment and conduct of dressing stations, camp sanitation, ambulance work, the transfer of the wounded, accountability for supplies, recruiting, the multitudinous "paper work," military amenities, etc., etc. But it must be borne in mind that what the man twenty to twenty-five years old can, and might well be asked by his country to do, can not well be expected of the established man of forty to sixty, fully occupied with his practice, hospital work, teaching, writing.

Nor is it difficult to believe that the same considerations that will deter many men from seeking commission in the Medical Section of the Officers' Reserve Corps may also deter others—lawyers, engineers, etc.—from joining other sections of the corps.

Universal military training, in youth, would solve many vexatious problems concerning the establishment of an adequate reserve for the country's defense. Meanwhile, it will be interesting to note the progress of events in the establishment of the Officers' Reserve Corps, the recruiting of a larger army, and the development, as "the second line," of the militia, now so vitally affected by their mobilization on the Mexican border.—W. M. B.

Surgical Suggestions

Do not forget that bladder symptoms such as attacks of pain, retention or incontinence of urine may be due to tabes or other nervous system disease.

Dribbling of urine in a bed patient may be due to an overfilled bladder (overflow incontinence). Pass a catheter—if the bladder is full the diagnosis is certain.

Bleeding from the uterus in a young woman is a good reason *not* to use the curette. The hemorrhage may be due to inflammation of the tubes, to ectopic gestation or to incomplete abortion.

Do not massage the fundus in the third stage of labor. Massage irritates the uterine muscle, favoring hemorrhage and retention of the placenta. When the afterbirth is loose the small hard fundus is felt riding on top of the dilated boggy vagina.

Post-partum chills and fever are more often due to causes outside the pelvic organs than to pelvic infection. Therefore examine the breasts (mastitis), kidneys (pyelitis), lungs (pneumonia) first, the genitals last of all.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

THE MILAN CLINIC FOR OCCUPATIONAL DISEASES.

Hospital and dispensary facilities for the investigation of occupational diseases are decidedly limited. The Milan Clinic was established in 1910, and has been under the direction of Dr. L. Deveto. There are many features of this clinic which should appeal to hospital organizers. Its method of work is excellently described by its director in Kober and Hanson's excellent book on "Diseases of Occupation and Vocational Hygiene."*

The clinic consists of three buildings, containing five dispensary rooms, eight infirmaries, and six isolating rooms, with a total capacity of 110 beds. As an evidence of the thoroughness with which provision has been made for scientific research, one need only instance the existence of three physiopathological laboratories, three bacteriological, and five chemical laboratories, five pathological, histological, and microscopical laboratories, three X-ray laboratories. In addition, there are found a library, an auditorium, an autopsy room, and an anatomic museum. Compared with this equipment for clinical research activities, most of our American institutions are found wanting.

The important characteristic of the institution is its realization that the treatment of patients is not the entire field of clinical service. There is a school for the benefit of physicians, scientific work in the field of occupational pathology, inspection and investigation of trades and industries, consultations with and examination of workmen, and a broad, popular propaganda of the hygiene of occupation. The scientific work which has been produced includes studies of over-exertion, the effects of dust upon tuberculosis, plumbism, phosphorism, pellagra, and various other phases of medicine related to occupation.

Medicine, as a rule, confines itself to the investigation of specific causes of illness or the pathological alterations of organs whose functions have been disturbed. The effect of living itself has not been recognized as a complex factor deserving involved analysis. Nutritional disorders have received renewed interest because of the demonstrated relation between dietaries and such diseases as scurvy, beriberi, and pellagra. Housing has given rise to inquiries, owing to the recognition that certain dwell-

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***Diseases of Occupation and Vocational Hygiene.* Edited by George M. Kober, M.D., LL.D., Washington, D. C., and William C. Hanson, M.D., Belmont, Mass. Octavo, 918 pages; illustrated. Philadelphia: P. Blakiston's Son & Co., 1916. $8.00 net.

ings appear to be actual centers of infection for such diseases as tuberculosis.

Shops, factories, and institutions have been placed under numerous legislative restrictions because of the fact that accidents and diseases, actually preventive in character, were occurring in numbers totally unwarranted.

Life in the present age involves actual participation in the affairs of the community. As individualism has declined or has merged into group activity, new factors have been introduced tending toward disability and disease, on the one hand, and health and the prolongation of life, on the other.

The introduction of social service work into a hospital or dispensary organization is a recognition of the important part that society itself plays in undermining the health of individuals or in promoting their convalescence and return to normality.

It is probable that few special occupational clinics will be necessary. The functions they deem necessary can readily be assumed by existent institutions, if adequate funds are available and if the fundamental point of view is accepted. The scientific spirit is lacking to a large extent in most of the existent dispensaries and the traditional methods of treatment still occupy the center of the dispensary stage. There is every reason to believe that a dispensary, to be effective, in a modern sense, must serve as a large social laboratory.

The socialization of medicine merely applies to a change in the point of view that is held by physicians in their contemplation of the causes of accidents and disease and to the remedies which must be brought to bear to secure their elimination. In the fields of physiology, pathology, hygiene, and statistics are found many problems whose solution may be achieved thru dispensary organization and co-operative social research.

Stress must naturally be placed upon the education of patients, the training of physicians, and the awakening of the general public to the important bearings of professional and industrial life upon the physical health and welfare of all types of workers. The questions of strains, fatigue, alcoholis, dusts, cannot be answered offhand, nor have there been accumulated sufficient data to give the necessary enlightenment as to their hazards, their effects, or their limitations.

Dispensaries should become centers for the study of the diseases, for the results of which the patients seek relief. The diagnosis and treatment of a thousand individuals suffering from nephritis does not, per se, advance the health interests of the community. Far greater value would result were it possible to trace back the origin of nephritis in a few instances with some degree of conclusiveness to the main causative factor. It would then be possible to inform the public of some one or more definite conditions active in causing nephritis. Information of this type would have an educative influence upon the trades and industries and give rise to reforms tending to remove the injurious factors responsible for the undermining of the health of the employe.

Herein is the real lesson to be derived from the Milan Clinic for Occupational Diseases. It has a definite purpose which is not personal in character, but extends throughout the occupations of men. It possesses a well-considered and organized program of activity. It possesses an equipment adequate to serve the community in an efficient manner. It recognizes its relation to patients, to physicians, to employers, to employes, and to the community. This is a conception of dispensary work and dispensary responsibility which is worthy of serious consideration, even though the scope of dispensary activities may not be limited to the field of occupational accidents and diseases.

Of interest in the field of medical sociology and preventive medicine is the merging of the *Texas Medical News* into a new, national publication, *Medical Insurance and Health Conservation,* with a change in size and style of the journal, as well as in its contents, and an increased circulation, which its wide scope will no doubt further enlarge. Dr. M. M. Smith will continue as editor, at Dallas, Texas, and he has associated with him as collaborators many men of prominence.

Book Reviews

Infections of the Hand. A Guide to the Surgical Treatment of Acute and Chronic Suppurative Processes in the Fingers, Hand and Forearm. By Allen B. Kanavel, M.D., Assistant Professor of Surgery, Northwestern University Medical School; Attending Surgeon, Wesley and Cook County Hospitals, Chicago. *Third Edition.* Octavo: 499 pages: 161 illustrations. Philadelphia and New York: Lea & Febiger, 1916.

No extended review is needed of this standard and authoritative work, based upon painstaking dissection and anatomical experiment and upon a wealth of critically analyzed clinical observations. It is not too much to say that Kanavel's book should be familiar to every surgeon and to every general practitioner who undertakes to treat even the simplest of those conditions that often result so disastrously—pyogenic infections of the fingers and hand.

This edition shows general revision and the addition of two very valuable chapters: one (written by Dr. Harry E. Mack) on Hand Infections Among Employees, and the other on the Sequelæ of Infections of the Hand, in which Kanavel describes certain operative and mechanical measures to overcome deformity and loss of function.

The Operating Room. By AMY ARMOUR SMITH, R.N., formerly Superintendent of New Rochelle Hospital, New York; Superintendent of Nurses at the S. R. Smith Infirmary, Staten Island, and at the Woman's Hospital of the State of New York. Duodecimo; 295 pages; 57 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1916. $1.50, net.

The preface to this little volume shows that its author is as modest as its text reveals her to be clever, experienced, pedagogically wise, and very human. She has builded better than she knew, for she has not only presented a large amount of technical information for nurses but she has also set forth admirably and in literary style the methods, discipline esprit de corps that underlie the training and the actual work of nurses in the operating room. The author's experience in large hospitals is indicated clearly in her observations concerning the relation of these nurses to their supervisor, the various surgeons (with various whims), the hospital management, the patient and his family, and the community.

We have much enjoyed reading this excellent little book, and we commend it cordially to operating room supervisors and nurses in training.

Principles of Diagnosis and Treatment in Heart Affections. By SIR JAMES MACKENZIE, M.D., F.R.S.C.P., LL D., AB. & ED., F.R.C.P. (HON.), physician to the London Hospital (in charge of the Cardiac Department), Consulting Physician to the Victoria Hospital, Burnley, London HENRY FROWDE, OXFORD UNIVERSITY PRESS, 1916. $2.50.

This book represents the compilation of a course of lectures delivered by Mackenzie. The author's object is to present to the general practitioner the recently acquired knowledge of cardiac conditions, emphasizing always the ordinary bedside methods of examination rather than the mechanical procedures such as polygraphing and electrocardiographing. Primarily then, the book attempts to give a better conception of what clinical medicine means and to stimulate interest along the lines of well established clinical investigation.

In a very clear way Mackenzie takes up the symptoms and conditions of cardiac disease, discusses each subject adequately and outlines the proper method of treatment. A helpful index completes the volume.

Collected Papers of the Mayo Clinic. Edited by MRS. M. H. MELLISH. Volume VII. Octavo; 983 pages; 286 illustrations. Philadelphia and London: W. B. SAUNDERS CO., 1916.

This is the 7th annual volume of articles published by members of the Mayo staff, the ninth volume including those containing the papers of the two Mayos prior to 1909. These nine large books represent, indeed, a large scientific output and, especially, a vast amount of clinical experience, to which, in recent years, has been added experimental investigation!

The papers are classified regionally, as before, are handsomely illustrated and well printed.

Progressive Medicine. Edited by HOBART EMORY HARE, M.D., assisted by L. F. APPELMAN, M.D., September 1, 1916. Philadelphia and New York: LEA & FABIGER.

This unusually interesting number contains the following reviews: Diseases of the Heart and Lungs, by William Ewart; Dermatology and Syphilis, by William G. Gottheil; Obstetrics, by E. P. Davis, and Diseases of the Nervous System, by William G. Spiller. These reviews maintain the higher order of excellence of previous volumes.

Progress in Surgery

A Résumé of Recent Literature.

Diagnosis and Treatment of Ureteral Calculi. E. BEER, New York. *New York State Journal of Medicine,* October, 1916.

Beer's observations are based upon the study of 98 cases. Of these, 34 were operated upon with 100 per cent. recoveries. Of the remaining 64 cases, 44 passed the stone; in some the passage was perhaps aided by ureteral manipulation. The end results in the remaining 20 cases is not known. Beer discusses the various methods of diagnosis and, of course, places the x-ray first. In 90 per cent. of the cases in which stones were removed the shadow was positive. In certain instances where the shadow was not typical, Beer resorts to ureterograph by injecting the ureters with argyrol and then subjecting the patient to radiography. This method he believes more valuable than the employment of the x-ray catheter. The next step of importance in the diagnosis is cystoscopy. In some instances, the stone may be seen in the mouth of the ureter, or a peculiar edema about the ureteral meatus may confirm the diagnosis. In other instances (24 of the 34 that came to operation) the ureteral catheter encountered the obstruction. In half the cases, furthermore, the indigo-carmine output was either much diminished or nil. The wax-tipped catheter is not regarded by Beer as very reliable. In some instances the stone may be dislodged by ureteral manipulation; in other instances dilation of the ureter with injections of glycerine or oil may prove successful. Beer also recommends copious draughts of water. He offers the following indications for operation:

1. Large size of calculus; stones as large as an almond pit rarely pass spontaneously or after ureteral manipulations, even though occasionally larger stones have been passed, as in Furniss' case, in which a stone the size of a pigeon's egg was passed after burning through the ureteral meatus with the high frequency cautery.
2. Repeated colics that do not advance the stone and interfere with the patient's activities.
3. Constant pains which interfere with the patient's activities.
4. Infection of kidney and ureter behind the stone.
5. Anuria due to ureter stone.
6. Stone in ureter of solitary kidney.
7. Extensive disease of second kidney.
8. Immobility of stone without pain.

Beer believes that secondary changes in the kidney are more common than has hitherto been believed, and that early operation, after trying the most conservative measures, should be more frequently practiced.

Effects of Retention in the Kidney of Media Employed in Pyelography. W. F. BRAASCH and F. G. MANN, Rochester, Minn. *American Journal of the Medical Sciences,* September, 1916.

Conclusions Derived from Clinical Data. 1. The greatest danger in the use of silver preparations is their retention in actively secreting kidneys

2. With multiple foci of necrosis the condition should be regarded as a septic nephritis and immediate nephrectomy is indicated.

3. Focal necrosis as the result of infection may follow the introduction of a ureteral catheter or of bland fluids into a pelvis with insufficient drainage.

4. Silver iodide suspensions are less harmful than the colloidal silver preparations

5. Thorium nitrate in 10 or 15 per cent. solutions causes the least reaction but casts a less distinct shadow.

Conclusions Derived from Experimental Data 1. Mild chemical irritants, as sodium chloride and boracic acid, when injected and retained in the pelvis of the kidney do not produce lesions of that organ

2. The effect of methylene blue was practically negligible

3. More stringent chemical irritants as sodium citrate

and 20 per cent. thorium nitrate, when tested in the same drastic manner, produce lesions of the kidney, which seem directly due to the chemical injected, and not to any concomitant or subsequent infection.

4. Argyrol, collargol, and cargentos were about equally responsible for producing the most marked changes noted. It was often possible to find areas in which the metal could be distinguished.

5. The weaker solutions of colloidal silver did not appear to be less harmful than a more concentrated solution.

6. The silver iodide preparations produced less changes in the kidney than the other silver solutions. Of the two preparations of silver iodide, the one in which it is suspended in quince-seed emulsion caused the least necrosis.

7. So far as we have been able to determine by the method employed, thorium nitrate (15 per cent. solution) did not produce changes in the kidney except possibly in one experiment. Care must be taken in its preparation that the solution is thoroughly neutralized.

Fractures of the Femur. W. L. Estes, South Bethlehem, Pa. *Annals of Surgery,* July, 1916.

When some time ago, this authority found by the old method of extension, external splints, etc., that only 2 per cent. of his cases had accurate apposition and further that in many instances fractures which seemed in perfect alignment and showed very little shortening by the usual methods of measurement, when skiagraphed, exhibited overlapping and poor apposition, he was led to practice far more generally the operative method and direct splinting of the bone. Of the last 65 fractures of the femur treated at Estes' clinic, 25 were treated by open operation. In other words, some 38 per cent. of the cases are now subjected to open operation as compared with 7 per cent. five years ago.

[The proximity of Estes' hospital (St. Luke's) to the Bethlehem Steel Works furnishes him with an abundant fracture material.]

In simple fractures of the femur, it is his custom to attempt reduction under general anesthesia and then to apply a permanent dressing, if the subsequent roentgenogram fails to show proper reduction, the attempt at reduction is repeated, and, if a second picture then shows the position to be bad, the patient is offered operation, which takes place within ten days after fracture.

Fractures of the neck of the femur within the capsule are treated conservatively except when the head has been dislocated from the acetabulum.

Fractures of the junction of the head and neck are maintained in more than the 45 degrees of abduction suggested by Whitman and by suspension and traction. Pertrochanteric fractures are treated in the same way without the extreme abduction.

Fractures of the upper third of the femur are most frequently observed in childhood. Because of the tendency of the proximal fragment to tilt upward and rotate outward, the non-operative reduction is difficult and unsatisfactory, consequently this class offers "special and cogent indication for the open method."

Fractures of the middle third of the femur which are transverse or nearly so and which cannot be reduced under anesthesia by appropriate traction and manipulation, should be subjected to open operation. It has been Estes' experience that if such transverse fractures are left overlapping, much deformity, doubtful union and usually long delayed and never satisfactory function, will result.

Fractures of the lower third. Estes makes special mention of a fracture—usually transverse—in which the distal fragment is displaced backwards and tilted so that the end presses backwards into the upper part of the popliteal space. This fracture is produced by the whirling motion caused by a rotating wheel. The children who jump on wagons and whose lower extremities are caught in the wheels, and workmen who are caught in large, slowly-revolving machine wheels, have this special kind of fracture. The pressure exerted against the bloodvessels and nerves in the popliteal space makes the speedy reduction of this fracture imperative. Similar to the supracondylar fractures of the lower end of the humerus, are these supracondylar fractures of the femur; the methods of reduction are also analogous. In the upper extremity the forearm is flexed upon the upper arm and fixed in this position, while in the lower extremity the leg is sharply flexed upon the thigh and by manipulation of the distal fragment reduction is usually accomplished. Estes states that "when reduced, as it is a transverse fracture, one has only to jam the fragments end to end and have them held in this position while the leg is slowly and carefully brought to its proper position. A plaster of Paris dressing may then be applied." [Note.—This is contrary to the practice of Lund of Boston, who maintains the leg flexed up on the thigh, because he considers this position is more effective in preventing recurrence of displacement.]

Naturally, in any of the above-mentioned types of fracture, interposition of soft parts furnishes adequate indication for open reduction.

According to Estes' experience, the operated cases require a little longer period in the hospital—possibly three weeks longer. The average period of disability for fracture of the femur is about 13 months. Most patients leave the hospital in 10 weeks, walking with the aid of a cane or crutches.

Estes confesses to a prejudice against the Steinmann nail method and prefers plating whenever any operation is necessary, fearing late infection of the nail hole.

Ankylosis of the Jaw. A report of 23 cases from the Clinic of John B. Murphy. P. H. Kreuscher, Chicago, *Interstate Medical Journal,* October, 1916.

The ankylosis may be bony, fibrous, due to cicatrical fixation about the joint or to intra-alveolar buccal adhesions. The operation which Kreuscher describes and which was devised by Murphy gives 100 per cent. successful results. Briefly, the operation consists in exposure of the joint by a vertical and slightly curved incision, removal of about one-half inch of the neck of the mandible by means of the chisel or Gigli Saw, formation of a pedunculated fat and periosteal flap from the exposed surface of the temporal muscle and insertion of this flap between the divided ends of the ramus, where it is fixed by a few sutures. A wooden block is placed between the teeth on the well side and kept in place until the flap has healed in. This block prevents the muscular contraction from compressing and necrotizing the flap. It is also important to obviate the formation of a hematoma, inasmuch as it may lead to necrosis and infection. The wound is therefore watched and if a hematoma is noted, it is aspirated. The operation is described in detail.

Chauffeur's Fracture of the Radius. A. C. Burnham, New York. *New York Medical Journal,* October 21, 1916.

The conventional notion that the fracture of the radius produced by cranking an automobile is a typical Colles' fracture is, according to Burnham, incorrect. The fracture is situated much lower than the typical Colles' fracture, and runs transversely close to the articular surface. In many instances the fracture enters the wrist joint. The fracture usually causes comparatively slight disability. A characteristic symptom is exquisite tenderness over the site of the fracture. Treatment is the same for other fractures of the lower ends of the radius.

Late Results of Splenectomy in Pernicious Anemia: A Statistical and Critical Review. E. B. Krumbhaar, Philadelphia. *Journal American Medical Association,* Sept. 2, 1916.

Krumbhaar concludes a statistical and critical review of the literature of splenectomy in pernicious anemia with the following conclusions: "1. Of the 153 patients studied, 19.6 per cent. died within six weeks; a distinct improvement in the clinical condition and in the blood picture occurred in 64.7 per cent., and no improvement in 15.7 per cent. 2. The rather high postoperative mortality (practically 20 per cent.) may be due to poor choice of cases in the early series. As a much greater proportion of the more recent cases have survived the operation, the true postoperative mortality is probably much less than 20 per cent. 3. Of the individuals who showed improvement shortly after operation, nearly two-thirds of the total number, a large number have failed to maintain this improvement, or have since died in a relapse or from intercurrent disease. 4 Although a few have continued in good condition, during the period of observation (over two years), in no case can it be said that a cure has been effected, and the blood of these individuals continues to show many of the characteristic signs of pernicious anemia 5. On account of the improvement that follows splenectomy, it would appear to be not only justifiable, but in many cases an advisable procedure; but in no case should a cure be promised or the operation undertaken except under the most favorable conditions. 6. The best results are obtained if the operation is preceded by one or more transfusions, and those patients who relapse after operation may still be greatly helped by transfusion. Whether or not transfusions would have produced equally good results in the absence of splenectomy is a question that cannot at present be decided. 7. The most favorable results may be expected in individuals who have not passed the fifth decade, in whom the disease has not progressed for more than a year, and who have a relatively good blood picture (that is, an anemia that is not of too extreme a degree or of the steady progressive type). Individuals with enlarged spleens have done better than those in whom the spleen was small or of normal size, as have also those suffering from an anemia characterized by excessive hemolysis. 8. The opposite of these conditions should be considered as unfavorable factors, as also should the existence of spinal cord symptoms, or the presence of an aplastic bone marrow.

Chronic Appendicitis and its Relation to Visceroptosis.

Archibald MacLaren, St. Paul. *Annuals of Surgery*, November, 1916.

Mac Laren is certain that chronic appendicitis does not exist unless associated with the history of at least one acute attack. It is important to bear this clearly in mind since many cases are operated upon for the removal of a chronically affected appendix whose symptoms become wrose rather than better after operation. Such pathologists as Ribbert, Wolfer and Zuckerkandl have shown that obliterative appendicitis is not due to inflammatory changes, but rather to an involution process in the functionless appendix. It is evident, therefore, that we cannot class this type of appendicitis with the chronic inflammatory conditions.

In visceroptosis or neurasthenia sometimes acute appendicitis is simulated, but as a rule the condition is mistaken for chronic appendicitis. In this type of patient, there is no true abdominal rigidity, and the abdominal pain will decrease or disappear when the patient lies down. This last point is all important in differentiating between true and false appendicitis.

Posture in Obstetrics.

J. W. Markoe, New York, *Journal of the American Medical Association*, October 7, 1916.

Markoe began in 1909, the study of posture in the different stages of labor. It came to his mind that if he could provide a suitable chair he would be able to utilize the weight of the uterine content advantageously in dilating the cervix and parturient canal. He reviews the history of the obstetric chair as used in past years in various countries down to the beginning of the nineteenth century. At present it is out of vogue in most civilized countries, but is still in use among the orientals. The present textbooks hardly mention it, but he points out its advantages over present methods. Its actual value in shortening the time of labor is not touched on in the textbooks. In an earlier article he suggested that a folding chair might be improvised which could be constructed of such material that is could be easily sterilized and so made that it could be folded up and carried from case to case. He has not found this easy to do, and he has, therefore, turned to the rocking chair, found in every home, which will make an excellent obstetric chair He believes that it should be used with discretion, but that applies to all medical procedures. Since he has begun the use of the chair he has had fewer obstetric operations, and statistics show an improvement, fewer deaths of the mother, fewer stillbirths and fewer deaths of children following labor. As far as perienal lacerations go, it has not, apparently, affected them, but he believes that in such complications the fault lies with the accoucheur in not controlling the progress of the child in time to prevent such accident. Several tables are given bearing out his recommendations, and, he says, bring home the distinct advantage of the use of the obstetric chair, especially in those cases in which, due to some abnormality in the fetus or mother, operative interference seems to be indicated.

Surgery of the Pituitary Fossa: The Methods of Approach.

V. Zachary Cope, London. *British Journal of Surgery*, July, 1916.

The symptoms of pituitary disorder which may call for operation are (1) general intracranial pressure symptoms· (2) local pressure symptoms, and (3) metabolic disorders. The most common indication for operation is (2) when the optic chiasma is involved.

The recognized routes by which to reach the pituitary fossa are as follows:

Horsley adopted a route through the temporal fossa.

König favors a transpalatal approach.

Loewe and Kocher resected the upper jaw and palate to reach the fossa through the sphenoidal cells.

Krause utilized a frontal flap.

Schloffer made use of the nasal route, splitting or reflecting the nose.

Kocher in 1909 urged an endonasal submucous approach. This procedure was perfected by Hirsch.

The need for an aseptic route has recently stimulated a revival of direct approach through the cranium in the frontal region. However, only four routes have proved themselves as practically available. These are (1) the Horsley temporal operation; (2) the Schloffer nasal operation; (3) Hirsch, and later, Cushing's submucous septal route, and finally (4) Frazier's fronto-orbital procedure.

Though it is not possible, as yet, to reach a final conclusion, enough has been done to show that the Hirsch-Cushing submucous nasal route and the fronto-orbital method of Frazier remain as the best routes for approaching the pituitary fossa.

The Radical Abdominal Operation for Carcinoma of the Cervix Uteri.

C. Berkley and V. Bonney, London. *British Medical Journal*, September 30, 1916.

The authors mean by the term "radical" not only complete removal of the uterus and adnexa, but removal of the broad ligament and all glands up to the bifurcation of the aorta. In some instances even the ureter and part of the bladder have been resected. In 100 cases, the mortality has been 20 per cent.; the cures, 39 per cent.; 32 per cent. died of recurrence; 2 died from another disease, and 7 patients were lost sight of. Cases in which the regional glands required removal gave only 7 per cent. of cures of the total of 39. These results make the authors to conclude that the operation is justified, despite the immediate high operative mortality

A Detailed Study of the Pathological Causes of Sterility with the End-Results.

John Osborn Polak, *Surgery, Gynecology and Obstetrics*, September, 1916.

Polak reviews 798 cases from his private practice of sterility and endeavors to analyze them from the viewpoint of etiology, anatomic, pathologic and biochemical, giving the treatment adapted to suit various types of cases. His best results were in cases in which there was no circulatory or inflammatory disturbance in the pelvis, the husband being potent. The reaction of the vaginal secretion in these cases was decidedly acid and the administration of sodium bicarbonate or sodium phosphate, one tablespoonful to the quart of water, to be used as a douche after retiring. Of 109 cases showing this reaction, 75 or 70 per cent. became pregnant. In fraginal hypertrophy is also considered by Polak as a favorable obstacle to be overcome by amputation of the cervix. Also unilateral ovarian cysts give good surgical cures as regards sterility. Other operative procedures, as plastics on the cervix other than amputation, plastics on the tubes, uterine suspension, etc., have but a slight influence on the end-results of sterility in women. The husband is largely responsible for our poor results in treatment. Of 358 women, in whom conception was a probability, there were 132 uterine and 2 ectopic pregnancies, or 37 per cent.

Delivery by Abdominal Section. By Edward P. Davis, *Surgery, Gynecology and Obstetrics*, October, 1916.

Two hundred and sixteen operations were performed by Davis for the delivery of the child by abdominal section. Of these, 129 were the classic cesarian section, 50 were hysterectomies in which the stump was dropped and the abdomen closed without drainage; 32 were Porro operations in which the stump was fastened by a clamp in the lower end of the abdominal incision; 3 extirpations of the uterus and 2 sections were performed at the moment of maternal death. Of the total number of cases there were 151 in which no complication of fatal visceral disease or sepsis could be determined. Only one case of these 151 was lost. Of the 60 cases that were infected and in bad condition, 16 died.

The indications for abdominal section in obstetrics have been widened considerably to include intra-abdominal conditions such as appendicitis, pelvic and abdominal abscesses, pelvic or abdominal tumors, cancer of the cervix and placenta previa—conditions which threaten the life of the mother or that of the child or both. Davis asserts that in patients who have lost children in previous labors through disproportion or physiological incompetence, although the pelvis may be of average size, one may rightfully elect delivery by section in the interest of the child.

Endoscopy of the Esophagus and Upper Air Passages in Children. C. J. Imperatori, New York. *N. Y. State Journal of Medicine*, September, 1916.

Imperatori holds that examination of the air passages and esophagus by direct inspection, either by the endoscope, bronchoscope or by suspension laryngoscopy should be practiced more frequently in children, especially for diagnostic purposes. Imperatori claims it is both easy and safe. He describes in detail the technique for the various forms of examination and gives a large number of indications. Imperatori advises against the use of a general anesthetic, but in the discussion of his paper, both Yankauer and McKenty strongly urge general anesthesia in children over two or three years. The indications for the use of bronchoscopy include in addition to the diagnosis and removal of foreign bodies such maladies as inflammations and diptheria of the larynx, trachea and bronchi, papillomata, bronchiectasis and abscesses of the lung etc.

The Accessory Sinuses of the Nose in their Relation to the Cranial Nerves. Louis G. Kaempfer, New York. *The Laryngoscope*, July, 1916.

In a discussion of the relationship of the first six cranial nerves to the accessory sinuses of the nose Kaempfer calls attention to the fact that they are more often involved than is generally supposed. A review of the literature shows autopsy reports of accessory sinus suppuration where, ante-mortem, it was never suspected.

The author goes into the anatomy of the region and shows how through unusual and abnormal anatomical relationships most bizarre involvement of the cranial nerves can take place.

The most important nerve in this series is the optic nerve. Infection of this nerve takes place either by direct extension of the inflammatory process through the bony wall of the nerve canal or through a dehiscence in it; by pressure from an orbital cellulitis or an orbital phlegmon secondary to the sinus disease; or by way of the lymphatics.

The next most important relationship is that of Meckel's ganglion to the sinuses and the trigeminal neuralgia secondary to sinus disease.

In conclusion he states:

1. Involvement of the nerve trunks and ganglia is possible by direct extension or by way of the blood and lymph streams.
2. The sinuses depart in their anatomical relations very frequently from the classical description and these variations may cause unusual and apparently unrelated groups of symptoms.
3. Symptoms of nerve involvement are always to be considered of deepest significance and may be the signs of profound involvement of important structures.
4. Early operative measures in disease of the accessory sinuses would prevent most of these cases from getting beyond the confines of the nose.

Gas Gangrene—Its Cause and Treatment. Kenneth Taylor, Paris, *Johns Hopkins Medical Bulletin*, October, 1916.

Taylor describes four stages: (1) The dormant. Taylor found in the bacillus areogenes capsulatus in .70 per cent. of all wounds at the Western front. (2) The stage of gaseous distension of the muscles. (3) The explosion stage. (4) The stage of systemic toxemia. The treatment depends on the stage in which the disease is met. A diagnosis in the first stage can be made by finding the bacillus in the wound. In this stage the wound is cleansed by a 1 per cent. solution of quinine hydrochloride. This solution Taylor has found to be most effective. All debris should be removed, including fragments of bone and necrotic portions of muscles. It is also important to avoid pressure on the wound by bandages, etc.; the wound must be kept wide open. In the stage of gaseous distension, numerous long longitudinal incisions must be made into the muscles. In the gangrenous stage, the only remedy is amputation, leaving the stump wide open.

The Prognostic Value of Blood Cultures in Erysipelas. T. R. Sprout, *Johns Hopkins Medical Bulletin*, October, 1916.

In a series of 34 cases, five showed a bacteriemia, of the five cases, 4 died. In the fifth, the number of colonies was very few, but the duration of the disease was long. Sprout believes, therefore, that a positive blood culture in Erysipelas is of grave import.

Injuries to the Peripheral Nerves Produced by Modern Warfare. C. B. Craig, New York. *American Journal of the Medical Sciences*, September, 1916.

Strangely enough, wounds of the nerves resulting from warfare are not common. The most common nerves affected are the musculo-spiral and the sciatic. The nerves may be lacerated or contused; by neurological examination, the differential diagnosis can, as a rule, be made, but sometimes exposure of the nerve is necessary. Cases of simple contusion recover slowly and, as a rule, completely. Gun-shot and shell wounds causing lacerations of the nerves do not lend themselves readily to plastic operation, owing to infection. During 10 months no recovery in such cases was observed.

Notes on the Treatment of Hernia Cerebri. S. Smith, *British Medical Journal*, July 22, 1916.

An experience with a large number of gunshot wounds of the head and with 20 cases of hernia cerebri leads Smith to some interesting deductions. To prevent hernia cerebri, Smith advocates making as small an opening in in the dura as possible. He has found repeated lumbar punctures to be of vast benefit in relieving hernia cerebri. This is done at intervals of every few days, depending on the response of the hernia to the puncture and upon the pressure of the cerebro-spinal fluid as determined by the apparatus of Page and Cassidy (see original article). It is not necessary to remove more than 8 drachms of fluid at a sitting. Indeed Smith has seen ominous symptoms and even death develop after removal of too much fluid.

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